MEDICAL LIBRARY

JUL 29 1949

BRITISH MEDICAL JOURNAL

JOURNAL OF THE BRITISH MEDICAL ASSOCIATION

SATURDAY JULY 16 1949

TABLE OF CONTENTS

Association of Certain Ovarian Cells with Endometrial Cancer
WILFRED SHAW, M.D., F.R.C.S., F.R.C.O.G., and BURJOR DASTUR, M.D., M.R.C.O.G. 113

Infantile Diarrhoea and Vomiting
JOAN TAYLOR, M.B., B. W. POWELL, M.B., and JOYCE WRIGHT, D.M. 117

What is Social Medicine? W. HOBSON, M.D., D.P.H. 125

The Age of the Menarche D. C. WILSON, M.D., M.R.C.P., F.R.C.O.G., and IAN SUTHERLAND, M.A., D.Phil. 130

Treatment of Infantile Gastro-enteritis C. Z. NEUMANN, M.D., D.C.H., M.R.C.P. 132

Experience with a Syringe Unit ANTHONY G. RICKARDS, M.D. 135

Amoebiasis in England as a Household Disease
A. R. D. ADAMS, M.D., F.R.C.P., and D. R. SEATON, M.B., M.R.C.P. 136

MEDICAL MEMORANDA

Salt and Water Depletion in Surgical Practice. D. T. H. PAINE, M.B., B.S., F.R.C.S., and D. R. DUFF, M.R.C.S. 137
Case of Polyorchidism. F. T. RANSON, F.R.C.S.Ed., F.A.C.S. 137
Gastro-colic Fistula after Vagotomy for Stomal Ulcer. JAMES A. KEY, M.B., F.R.C.S. 138

GENERAL ARTICLES AND NEWS

British Congress of Obstetrics and Gynaecology 147
Commonwealth and Empire Tuberculosis Conference 150
Progress in Treatment of Rheumatic Disorders 154
MATERNITY AND CHILD WELFARE CONFERENCE 158
NOVA ET VETERA 159
UNIVERSITIES AND COLLEGES 181
THE SERVICES 182
MEDICAL NOTES IN PARLIAMENT 183
MEDICAL NEWS 187
BIRTHS, MARRIAGES, AND DEATHS 188
QUESTIONS AND COMMENTS 189

OBITUARY

H. A. Cookson, C.B.E., F.R.C.P.Ed., F.R.C.S.Ed. 180
A. F. Cowan, F.R.C.S.Ed. 180
L. S. Morgan, M.B. 180
C. M. G. Elliott, L.R.C.P.Ed. 180
H. B. Lieberman, F.R.C.S.Ed. 180
G. T. Willan, D.S.O., M.R.C.S. 181
J. G. Leebody, M.B., F.R.C.S.Ed. 181

LEADING ARTICLES

Aetiology of Infantile Enteritis 141
Exchange Transfusion 142
High-voltage X Rays 143
Arbitration 145

ANNOTATION

The Onset of Menstruation 146

REVIEWS

Continental Haematology 139
Physiology of Vision 139
Occupational Marks 139
Local Analgesia 139
Analgesia in Midwifery 140
Catholic Psychology 140
Books Received 140

MEDICO-LEGAL

A Still Longer Gestation Period 181

Epidemiology Section 186

SUPPLEMENT

Health Service.—MINISTRY'S REPLY TO CONSULTANTS — THE CONSULTANTS' "NO" — HOSPITAL EYE SERVICE — MEDICINE IN EIRE 47
HEARD AT HEADQUARTERS 48
QUESTIONS ANSWERED 48
CORRESPONDENCE 49
ASSOCIATION NOTICES 52

CORRESPONDENCE

Man and the Machine. JOHN A. RYLE, M.D. 176
Anopheles Eradication in Cyprus. G. MACDONALD, M.D. 176
Prophylaxis of Goitre. JAMES A. GOODFELLOW, M.B. 176
Mind, Machine, and Man. J. A. V. BATES, M.B. 177
Partial Gastrectomy for Peptic Ulcer. DAVID C. FAINER, M.D. 177
Chlorosis. JANE M. FULLERTON, M.B. 178
Research in Renal Disease 178
Epidermolysis Bullosa. H. LEE, M.D. 178
Diagnostic Tests for Phaeochromocytoma. B. JOLLES, M.D. 178
Abortions and Psychoneurosis. E. HOWARD KITCHING, M.D.; W. A. O'CONNOR, L.M.S.S.A.; NORMAN HAIRE, ch.M. 179

B.M.A. SECTIONS

Summary of Proceedings

Anatomy 160
Medicine 161, 166
Pathology and Bacteriology 162, 169
Surgery and Neurology and Psychiatry 163
Anaesthetics 164
Occupational Health 165
Rheumatology 166
Obstetrics and Gynaecology 168
Radiology 170
Surgery 171
Cardiology 172
Dermatology 173
Ophthalmology 174
Oto-rhino-laryngology 175
Clinical Demonstrations 175

BRITISH MEDICAL ASSOCIATION, TAVISTOCK SQUARE, LONDON, W.C.1

No. 4619, WEEKLY, PRICE 1/6

Copyright

REGISTERED AS A NEWSPAPER

From single-cell selection
to large-scale production

D.C.L.
VITAMIN B_1 YEAST

is subjected to the strictest biological and chemical control. The special yeast contains approximately:

Vitamin B_1	300 International Units per gram. (900 micrograms)
Riboflavin	50 micrograms per gram.
Nicotinic Acid	250-350 micrograms per gram.
Vitamin B_6 (Pyridoxin)	25-50 micrograms per gram.

(3 D.C.L. Tablets equal 1 gram)

Members of the Medical Profession are invited to write for full particulars and a trial supply.

THE DISTILLERS COMPANY LTD., EDINBURGH

ZŌPLA

STRAPPING

Zōpla Strapping is a first class product for surgical use. Very strong cloths, the mass is powerfully adhesive. White and Flesh Cloths, also on Elastic Cloth.

WHITE FELT

Zōpla on White Felt is very popular for padding and protective purposes. Does not harden in use.

ZŌPLA-BAND

Zōpla-Band, Elastic Adhesive Bandage, ideal where elasticity is essential.

MANUFACTURED BY
LESLIES LTD
EST 1823
HIGHAM HILL RD
WALTHAMSTOW
LONDON, E.17

Energen

DIETARY SERVICE

offers to the Medical Profession, free of charge, standard diets for upwards of 30 common disturbances of health including:

OBESITY
DIGESTIVE DISORDERS
DIABETES
HIGH BLOOD PRESSURE
RHEUMATISM

In addition, doctors are invited to apply for special dietaries to meet the requirements of individual patients.

Write to:—
SECRETARY, ENERGEN DIETARY SERVICE
(Dept. A.13), WILLESDEN, N.W.10

THE NATIONAL HEALTH SERVICE

means that your insurances need reconsideration. The

MEDICAL SICKNESS SOCIETY

can give you advice and is introducing special policies to meet the needs o the Doctor in the Service. For particulars please write to

THE MEDICAL SICKNESS, ANNUITY LIFE & ASSURANCE SOCIETY, LTD.
7, Cavendish Square, London, W.1
(Tel.: LANgham 2992)

referring to this advertisement

BRITISH MEDICAL JOURNAL

LONDON SATURDAY JULY 16 1949

THE ASSOCIATION OF CERTAIN OVARIAN CELLS WITH ENDOMETRIAL CANCER*

BY

WILFRED SHAW, M.D., F.R.C.S., F.R.C.O.G.

AND

BURJOR DASTUR, M.D.Bombay, M.R.C.O.G.

(From the Williamson Laboratory of the Medical College, from the Gynaecological Department, St. Bartholomew's Hospital, London, and from St. Andrew's Hospital, Dollis Hill)

Much attention has been paid in recent years to a possible relation between ovarian function and the development of adenocarcinoma of the endometrium. Marital status and previous pregnancies have been studied by Healy and Brown (1939), and delayed menopause followed by the development of endometrial carcinoma by Crossen and Hobbs (1935), Randall (1945), Masson and Gregg (1940), and Taylor and Millen (1938). A great deal has been written on a possible connexion between endometrial hyperplasia and the development of carcinoma (Novak and Yui, 1936; Jones and Brewer, 1941; Howard Taylor, 1932). The high incidence of corpus carcinoma with granulosa- and theca-cell tumours has been studied by Schröder (1922), Dockerty (1940), Hodgson, Dockerty, and Mussen (1945), Banner and Dockerty (1945), and Hertig (1945). Recently a paper by Woll, Hertig, Van S. Smith, and Johnson (1948) has drawn attention to the presence of cortical granulomata and thecomatosis in association with adenocarcinoma of the endometrium.

Case 1

On June 5, 1947, a married woman aged 81, with three children, was operated upon. A large combined Brenner tumour and pseudomucinous cystadenoma of the left ovary, together with a small cystic right ovary and the uterus, were removed (W.S.). An early adenocarcinoma of the endometrium was found in the uterus. The large tumour was a typical combined Brenner tumour and pseudomucinous cystadenoma. The case was examined with some care histologically, because it was hoped to investigate the cause of uterine bleeding with Brenner tumours. In the right ovary was a small Brenner tumour together with a cystoma, but the mesovarium contained unusual cells. The cells were localized to the part of the mesovarium immediately adjacent to the cortex of the ovary, approximately at the level of the white line. The cells were large and polyhedral and the protoplasm stained deeply with eosin. The nuclei were large and spherical (Fig. 1) and the cells were superficially similar to the paralutein cells of a mature corpus luteum.

The appearance of the cells suggested that they were in a state of activity, and from their resemblance to paralutein cells it seemed reasonable to believe that they were secreting a hormone-like substance. The rete ovarii also showed some activity. The patient was aged 81, so there was no question that the cells were derived from follicles. Moreover, the location of the cells was quite different from that of Graafian follicles. At the time it was believed that the cells were probably oestrogenic, and it was thought that they might be responsible for the myohyperplasia found in the uterus and might explain the post-menopausal haemorrhage encountered with Brenner tumours.

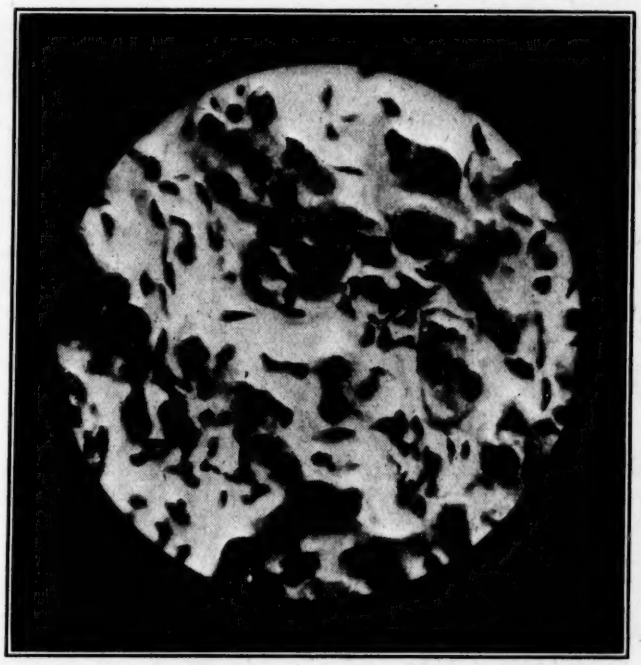


FIG. 1.—Cells under high magnification (Case 1). Although mainly polyhedral, their shape varies. In the lower part of the photograph the cells seem to be fused together. The characteristic rounded nuclei of the cells can be seen. These cells were found near the hilum at the level of the white line.

Case 2

On Sept. 24, 1947, a nulliparous married woman, aged 40, was operated upon (W.S.) for what was believed to be metropathia haemorrhagica. There was a history of amenorrhoea followed by continuous bleeding. The uterus was found to be slightly enlarged, and the right ovary was palpably about twice the normal size. A subtotal hysterectomy and a right salpingo-oophorectomy were performed. At operation the right ovary was found to be symmetrically enlarged and not to con-

*Received for publication on June 25.

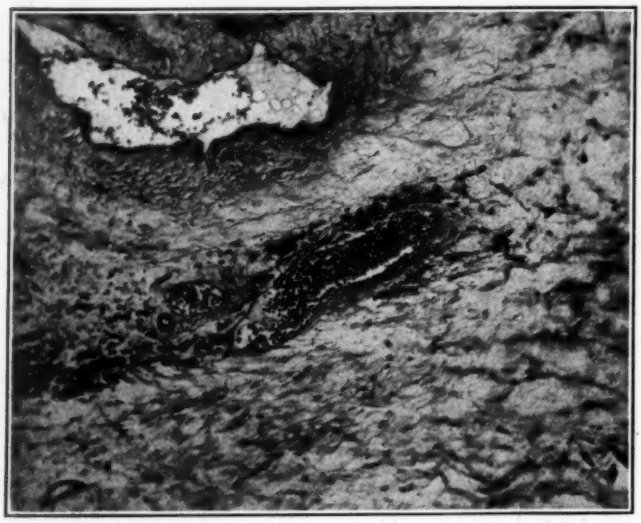


FIG. 2.—Cell clusters, Case 2. The large deeply staining cells which surround the blood vessel in the middle of the photomicrograph are the cells which we describe. The cells seem to be spreading out from the wall of the blood vessel. The light area represents the medulla of the ovary, while, to the left and above, the deeply staining cells form part of the cortex. The cells shown to the left are better differentiated than those which surround the vessel in the centre.

tain a cyst. The endometrium was not polypoidal and was only slightly irregular to the naked eye. The specimen was examined histologically, when a very early adenocarcinoma of the endometrium was found. The tumour was only a few millimetres in diameter.

Comment on Cases 1 and 2

For various reasons it was felt that these two cases should be investigated in detail and reported in the literature.

It was not until March, 1949, that we were able to start work on these and other cases. Case 2 was clearly of an unusual type; consequently the ovary which had been removed was examined in great detail. It contained a small number of primordial follicles, a normal number of interstitial cells, but no corpus luteum and no active Graafian follicle. To our surprise we found deeply staining polyhedral cells in the ovarian medulla which were morphologically identical with those found in Case 1. The identification of the cells was much more difficult than in the first case, for the patient was aged 40 and it was essential to prove that the cell clusters were independent of the follicle system. We have had some experience of ovarian histology and in the past have investigated the morphology of Graafian follicles (Shaw, 1927a), atretic follicles (Shaw, 1925), corpora lutea, and interstitial cells (Shaw, 1926). We concluded that the cells were independent of the follicular system and were not derived from either granulosa or theca interna cells. The analysis was rigorous and critical. No atretic body was found in the vicinity of the cells. The cells were localized to the medulla and the cell clusters were found in separate parts of the ovary without any communication between the clusters. The cells were mainly polyhedral, with rounded nuclei, but sometimes they were fusiform and sometimes stellate. In other areas they were syncytial-like, with the protoplasm of adjacent cells fusing together. The unusual forms of cells found in chocolate cysts have been investigated previously (Shaw, 1927b; Shaw, 1933), and the cell clusters identified in this specimen were different from any of the types of cell found with chocolate cysts of the ovaries. In this case the cells were not located to the subcortical area of the mesovarium but had spread into the medulla. (Photomicrographs of the cells are shown in Figs. 2–5.)

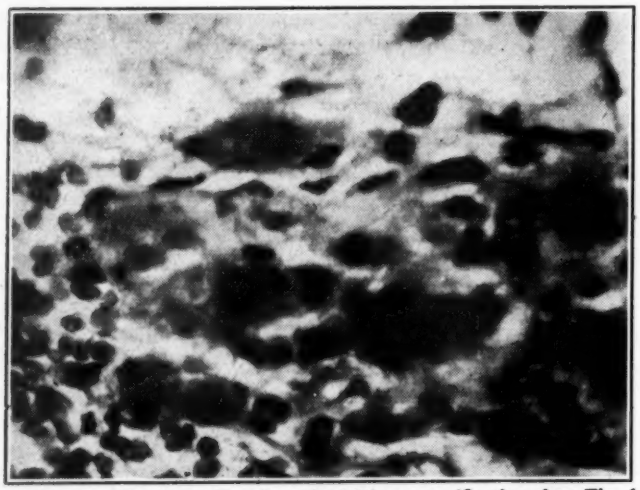


FIG. 3.—Cells from Case 2, under higher magnification than Fig. 1. The same rounded nuclei and the same peculiarities of the cell outline can be seen.

FIG. 4.—Case 2, illustrating the close relation of the cells to the endothelium of the blood vessels. The syncytial-like appearance of the cells is well shown. Above lies the lumen of the vessel with red blood corpuscles.

FIG. 5.—Another illustration showing the close relation of the cells to the endothelium. The lumen of the vessel lies in the upper part of the photograph.

As a result of the investigation of these two cases it seemed possible that the cell clusters might have some relation to the development of an adenocarcinoma of the endometrium.

Case 3

A married woman, aged 57, had been treated in 1940 by one of us for menopausal haemorrhage by means of an intra-uterine application of 50 mg. of radium for 48 hours. The patient was nulliparous. She was admitted to hospital on March 10, 1949, complaining of vaginal haemorrhage of 14 days' duration. A biopsy combined with curettage of the cervical canal was carried out next day, and a squamous-celled carcinoma was demonstrated in the specimen. On March 25 a Schauta operation was performed (W.S.) and both ovaries were removed. The uterus contained an early endocervical carcinoma. The ovaries were shrunken.

In view of the findings in the first two cases, both ovaries were examined in great detail. The same cell clusters found in the first two cases were demonstrated in the vicinity of the white line in one ovary. The cells had the typical appearance of those found in the other cases. The cell clusters were also found in the second ovary. Some were localized to the vicinity of the white line, while others were identified in the medulla in the neighbourhood of strands of hyaline tissue.

Case 4

A single woman, aged 51, was admitted to hospital on May 18, 1949, complaining of lower abdominal pain and irregular post-menopausal haemorrhage. Curettage was performed by the house-surgeon, and the pathologist reported that the material removed suggested that the patient had an endocervical carcinoma. Because of this report a Wertheim operation was performed on May 27 (W.S.). The growth was found to be an adenocarcinoma of the endometrium, and it was clear that the material removed at the curettage was the lower pole of a polypoidal projection. The ovaries were examined in detail. They were more vascular than normal. They contained no Graafian follicles and no recently atretic follicles. Again, the cell clusters were found in the hilum of one ovary in the mesovarium at the level of the white line. The cells have been found, up to the present, in only one ovary. In this case the cell clusters were less numerous than in the first three cases. On the other hand, the carcinoma was more advanced.

Examination of Controls

At this stage of the investigation it became obvious that controls must be examined, although one of us has spent much time upon the histology of the normal ovary and could not recall seeing such cells previously. It was realized, however, that much of this previous work had dealt with the follicular system. One of us has a large collection of slides of ovaries obtained from the Williamson laboratory. They have been regarded in the past as being extremely valuable, and were removed from the laboratory before the war. The slides are numbered in accordance with the registration system of the laboratory.

One evening some 200 of these slides were examined, and in only one were the cell clusters discovered. The next day it was possible to identify the slide. The specimen had been obtained in 1932 by a Wertheim operation (W.S.) performed upon a multipara of 55. In this case the carcinoma was endocervical in type and a pyometra had developed in the cavity of the uterus above the level of the carcinoma. Although the report given from the laboratory stated that the ovaries were normal, one of us had a vague feeling that he had seen the cells as long ago as 1932 and had been puzzled by them but had not investigated them further. After the identification of the cell clusters in this fifth case of carcinoma of the uterus, particularly as the identification had been made without any possibility of bias, we became convinced that the cell clusters had some association with adenocarcinoma of the endometrium and cervical canal.

The next step was to examine the collection of slides in the Williamson laboratory. One of us had been in charge of the laboratory when it was started, and had insisted that every slide and every paraffin block should be stored. Unfortunately, the collection was badly damaged by bombing, and only with the greatest difficulty have old slides been found and identified. Moreover, it seems almost impossible to sort out the paraffin blocks, with the result that the investigation of the specimens is imperfect and incomplete. We have collected together 58 specimens of ovaries from cases of carcinoma of the uterus. We have thought it best to group the cases into those of adenocarcinoma of the endometrium, endocervical carcinoma, and squamous-celled carcinoma of the vaginal portion of the cervix. The results are as follows:

Adenocarcinoma of the endometrium.—Total specimens, 48 (cell clusters found, 24; no cells found, 24).

Endocervical carcinoma.—Total specimens, 9 (cell clusters found, 6; no cells found, 3).

Squamous-celled carcinoma of the portio.—Total specimens, 1 (cell clusters found, 0; no cells found, 1).

The interpretation of these figures is important. The four cases completely investigated were all positive. In the third of these four cases many sections were made before the cells could be identified. In all cases, apart from these four, only one slide of the ovaries has been available. Consequently the negative findings are not regarded as conclusive. We believe that it may be necessary to make a large number of sections from an ovary before the cells can be identified. The small number of cases of squamous-celled carcinoma of the portio is explained because carcinoma of the cervix has usually been treated with radium at St. Bartholomew's Hospital. We are not prepared to draw any conclusions about the incidence of cell clusters in squamous-celled carcinoma of the portio from the material we have at our disposal.

We must stress the difficulty of demonstrating the cells. If they are aggregated in the mesovarium, at the level of the white line, in close proximity to the edge of the cortex, they can be recognized without much difficulty. If, however, they are scattered through the medulla it may be necessary to examine the whole ovary fairly extensively before they can be demonstrated. The size of the cells and their deep staining with eosin help in their recognition. In no case have we found a large number of cells, and we do not regard their detection as being particularly simple.

We have not been able to trace any reference to the cells in the literature. It seems highly improbable that they have not been recognized before and we believe that some previous description will be found.

Significance of the Cells

The number of cases examined is small and we are unlikely to be able to collect a large number of specimens in the immediate future. We have therefore thought it advisable to publish these results so that a wide search can be made in other laboratories. We are convinced that the cells are found in association with carcinoma of the endometrium and cervical canal. It may be that time will show that our work on control specimens has been incomplete, and that similar cells will be found in ovaries not associated with carcinoma of the uterus, but that is not our belief at the present time. Furthermore, at this early stage of the investigation any views that we may put forward are conjectural, hypothetical, and perhaps unsound.

In our view the cells are carcinogenic and lead to the development either of an adenocarcinoma of the endometrium or of an endocervical carcinoma of the cervix. At the moment we have insufficient evidence to show that there is a relation between the cell clusters and the development of squamous-celled carcinoma of the portio. Against this view is the possibility that the cell clusters appear as the result of the stimulation of the ovaries by the carcinoma, and it may be that both the cell clusters and the carcinoma are induced coincidentally by some third factor. The dominance of the uterus by the ovaries has always been the main theme of our previous work on the ovaries. Indeed, the cells of the cell clusters are so similar in type to granulosa-lutein and theca-lutein cells that we feel that the cell clusters are the cause and the uterine cancer the effect.

We are of course familiar with the literature on the development of adenocarcinoma of the endometrium in the absence of both ovaries; three cases were recorded by G. Van S. Smith (1941). We are also acquainted with the large number of cases of stump carcinomata arising after subtotal hysterectomy. Nevertheless, only very few cases of adenocarcinoma of the endometrium arising after the removal of both ovaries are on record. It is possible that cell clusters may be found in the mesovarium further along the ovario-pelvic fold, and that such cells left behind at operation initiated the adenocarcinoma in the cases described. The stump-carcinoma cases arising after the removal of both ovaries cannot be explained by the theory we have put forward. Although it is well known that in many of the cases the carcinoma was already present before the hysterectomy was performed, we must accept the view that a stump carcinoma may develop in the absence of both ovaries. It may be that these cases are mainly squamous growths of the portio.

The frequent localization of the cell clusters to the specific zone in the vicinity of the white line seems to us to be of the utmost significance. We believe that this area should be regarded as an organizing centre for activating cells which are carcinogenic to the endometrium of the body of the uterus and of the cervical canal.

Origin of Cells

We believe that the cells described above are not found either in the normal ovary or in the hilum of the ovary of patients who are not suffering from carcinoma of the uterus. An attempt has been made with the material at our disposal to trace the origin of the cells. Case 2 was of much interest, because the cell clusters seemed to be spreading not only into the medulla of the ovary but circumferentially between the medulla and the cortex. The variation in shape and the syncytial-like arrangement of the cells imply that they were actively dividing. They were invariably found in the vicinity of blood vessels, and we believe that we have traced their origin from the endothelium of small capillaries and of lymphatics. Neither of us is a trained cytologist, so that this opinion may be of little value.

If, however, our main thesis is correct, that the cell clusters are carcinogenic to the endometrium of the body of the uterus and the cervical canal, some attempt must be made to explain why the cell clusters appear. The obvious interpretation is that a hypothetical hormone causes the cells to develop from the endothelium of the blood vessels or lymphatic spaces. This implies that the cause of carcinoma of the endometrium and cervical canal is not a local phenomenon. We realize that such a possibility may alter previous views on the development of carcinoma.

Other lines of investigation present themselves immediately. We feel that wherever possible ovaries from cases of carcinoma arising elsewhere in the body should be examined histologically. This is particularly so in the case of carcinoma of the breast, for there is evidence that malignant disease of the breast sometimes retrogresses after the removal of both ovaries. A similar investigation might be made of the testis and epididymis in cases of carcinoma of the prostate.

Case 3 is of some importance gynaecologically. The patient had been treated previously with radium and an artificial menopause had been created. Although the follicular system in the ovaries had retrogressed completely, the cell clusters were found not only near the white line but also in the medulla. The findings suggest that the cells appear after the creation of an artificial menopause, and that many of the puzzling features of the development of carcinoma of the endometrium after radiotherapy can be explained. Again, in the radium treatment of carcinoma of the uterus it seems that the cells must first be destroyed by radium, otherwise a recurrence of carcinoma is to be expected. It seems to us important to determine whether the cells clusters disappear after the application of radium to the cervix. If the cell clusters are not destroyed, and our thesis that they are carcinogenic is correct, the procedure in such cases should be to remove the ovaries before radium treatment is instituted.

Conclusions

Unusual cells have been demonstrated in the mesovarium and medulla of the ovaries of cases of adenocarcinoma of the endometrium and of endocervical carcinoma of the uterus. So far as we know, the cells have not been described before. If they have been described, little attention has been paid to them. The cells do not seem to be found in normal ovaries, and their presence seems to be restricted to cases of carcinoma of the uterus. They are usually found in the mesovarium, close to the termination of the cortex of the ovary, but they may also be found in the ovarian medulla and, very rarely, in the cortex. Although they may possibly appear as the result of some reaction from the uterine carcinoma or may be stimulated to appear by a hypothetical factor which also initiates the carcinoma of the uterus, we incline to the view that they are carcinogenic. Our main difficulty has been to obtain material.

In only four cases have the ovaries been investigated in great detail. In 54 other cases of carcinoma of the body of the uterus and carcinoma of the cervix, only one slide of one ovary has been available. Of these 54 cases the cells have been found in 26. We emphasize the difficulty of identifying the cells, and we firmly believe that the cells would have been found in a larger number if the whole of the ovaries had been available for examination. Nevertheless, even in this small and imperfect series the incidence of the cells is appreciable. We feel that further investigations should be made, and if specimens are removed and suitable laboratory facilities are not available we hope that the specimens will be sent to us for examination. The number of cases of squamous-celled carcinoma of the portio available for investigation is surprisingly small, and we are not prepared to offer any comment on the association of the cells with the development of this form of cancer of the uterus.

Summary

Unusual cells have been demonstrated in the mesovarium and ovarian medulla of cases of adenocarcinoma of the endometrium and of endocervical carcinoma.

The cells are secretory in type, yet differ morphologically from any ovarian cells known to us.

They have not been discovered in control cases.

They are found only in relatively small numbers and may be extremely difficult to detect. A single section through the ovary is insufficient, as a general rule, to demonstrate them.

The cells may possibly be carcinogenic, secreting a hormone which stimulates some of the cells of the endometrium of the body of the uterus and cervical canal to undergo malignant change. It is hoped that a further search for them will be made in other laboratories.

Our thanks are due to Mr. Bert Cambridge, of the Williamson Laboratory, for his great help, particularly in sorting out microscope slides from bomb debris, and to Mr. Norman K. Harrison, A.R.P.S., of the photographic department, who has offered every possible facility. Miss J. E. Colley has given secretarial help enthusiastically at unusual times of the day, and her knowledge of the literature has been most useful. Miss Joan Wheelwright has followed the work with great interest, instilling the optimism of youth at the most critical phase of the investigation.

REFERENCES

Banner, E. A., and Dockerty, M. B. (1945). *Surg. Gynec. Obstet.*, **81**, 234.
Crossen, R. J., and Hobbs, J. E. (1935). *J. Mo. med. Ass.*, **32**, 361.
Dockerty, M. B. (1940). *Amer. J. Obstet. Gynec.*, **39**, 434.
Healy, W. P., and Brown, R. L. (1939). Ibid., **38**, 1.
Hodgson, J. E., Dockerty, M. B., and Mussey, R. D. (1945). *Surg. Gynec. Obstet.*, **81**, 631.
Hertig, A. (1945). Quoted by J. V. Meigs, *New Engl. J. Med.*, 1945, **233**, 11.
Jones, H. O., and Brewer, J. I. (1941). *Amer. J. Obstet. Gynec.*, **42**, 207.
Masson, J. C., and Gregg, R. O. (1940). *Surg. Gynec. Obstet.*, **70**, 1083.
Novak, E., and Yui, E. (1936). *Amer. J. Obstet. Gynec.*, **32**, 674.
Randall, C. L. (1945). *J. Amer. med. Ass.*, **127**, 20.
Schröder, R. (1922). *Zbl. Gynäk.*, **46**, 195.
Shaw, Wilfred (1925). *J. Obstet. Gynaec. Brit. Emp.*, **32**, 1.
—— (1926). Ibid., **33**, 183.
—— (1927a). Ibid., **34**, 469.
—— (1927b). Ibid., **34**, 300.
—— (1933). Ibid., **40**, 1125.
Smith, G. Van S. (1941). *New Engl. J. Med.*, **225**, 608.
Taylor, H. C., jun. (1932). *Amer. J. Obstet. Gynec.*, **23**, 309.
—— and Millen, R. (1938). Ibid., **36**, 22.
Woll, E., Hertig, A. T., Smith, G. Van S., and Johnson, L. C. (1948). Ibid., **56**, 617.

INFANTILE DIARRHOEA AND VOMITING

A CLINICAL AND BACTERIOLOGICAL INVESTIGATION

BY

JOAN TAYLOR, M.B., B.S., B.Sc., D.P.H.

From the Salmonella Reference Laboratory, Central Public Health Laboratory, Colindale

B. W. POWELL, M.B., M.R.C.P., D.C.H.

Working full-time for the Medical Research Council; from the Hospital for Sick Children, Great Ormond Street

AND

JOYCE WRIGHT, D.M.

Member of the Medical Research Council's Scientific Staff from the Research Laboratories of the Hospital for Sick Children, Great Ormond Street

This paper reports the results of a combined clinical and bacteriological investigation of infantile diarrhoea and vomiting, and includes a note by Dr. F. O. MacCallum on his virus investigations. In order that cases of infective origin should be presented for bacteriological study the clinical material was drawn in the main from outbreaks of diarrhoea and vomiting and from intercurrent attacks in hospital wards. In addition there were included two series of cases admitted consecutively to the gastro-enteritis units of a children's hospital and of an infectious diseases hospital. In these groups there was sometimes uncertainty whether cases should be classified as "infective," "dietetic," or "secondary to parenteral infection."

The first outbreak occurred in the nurseries of a maternity unit, and a number of observers took part in its investigation. Subsequently the course of each outbreak and the clinical progress of each case were followed by one paediatrician. Material for bacteriological examination was dealt with at a centrally placed laboratory as soon as possible after collection. In this way a wide area of field investigation could conveniently be covered. The methods and results of the general bacteriological investigation of the cases are given in a later section.

The detailed study by Crowley *et al.* (1941) left little expectation that a bacterial agent might be determined by a quantitative comparison of the faecal flora of affected and unaffected babies. From the outset of the present investigation it had seemed that bacterial studies would need to follow the modern trend towards subdivision of genera by serological, biochemical, and phage-typing methods. Primary culture plates or subcultured strains were therefore sent to laboratories specially equipped for their detailed examination. Similarly, for virus studies, post-mortem tissues and other material were submitted to a laboratory engaged in virus research.

Previous investigators (Costello and Lind, 1939; Sakula, 1943; Sevitt, 1945; Light and Hodes, 1943; Buddingh and Dodd, 1944) have found a variety of bacterial and virus agents associated with infantile diarrhoea and vomiting. Bray (1945) isolated a particular serological type of *Bact. coli var. neapolitanum* from 42 out of 44 cases of infantile "summer diarrhoea." From an early stage of our investigation, work on a certain type of *Bact. coli* provided a promising line to pursue. Sera for its identification were prepared from the *Bact. coli* strains of infants suffering from epidemic diarrhoea of the newborn. The outbreak in which these cases occurred is described under Group A below. The strain is referred to throughout the paper as *Bact. coli* D 433. A description of the serological work, together with an account of the biochemical activities and other characters of the strain, are given in a later section.

The main purpose of this paper is to report the association of *Bact. coli* D 433 with certain groups of cases of infantile diarrhoea and vomiting and its absence in control groups of healthy and sick babies. Work on similar lines was published by Giles and Sangster in March, 1948. They reported the isolation of a serologically homogeneous strain of *Bact. coli* from over 90% of cases of primary infective gastro-enteritis admitted to hospital during an outbreak in the city of Aberdeen in 1947.

Cases of Infantile Diarrhoea and Vomiting

Clinical and bacteriological investigations were made on the following groups of infants suffering from diarrhoea and vomiting: one outbreak in a maternity unit (Group A); two outbreaks in a mothers and babies' hostel (Groups B and C); one outbreak in a residential nursery (Group D); intercurrent cases of diarrhoea and vomiting in a children's hospital (Group E); routine admissions to two gastro-enteritis units (Groups F and G); and endemic diarrhoea and vomiting in a residential nursery (Group H).

Group A

An outbreak of epidemic diarrhoea of the newborn occurred in February and March, 1947, in the 90-bed maternity unit of a Derbyshire hospital. In all, 20 babies contracted the disease and 14 of them died. At the onset of the illness the age of 19 of the babies was from 6 to 20 days, and that of one baby, retained for the treatment of minor sepsis, was 43 days. All the babies had received early glucose feeds.

Fifteen were fully bottle-fed and four partially breast-fed at the time when the illness began; one baby, apart from early glucose feeds, had been fully breast-fed from birth.

The outstanding symptom was diarrhoea with frequent watery green or yellow stools, preceded in some cases by a period of lethargy, reluctance to feed, and loss of weight. Vomiting also occurred in all cases. Parenteral infection was limited to one case of early bronchopneumonia, some subcutaneous abscesses, and a few minor skin infections. All the babies became dehydrated, most of them severely so.

Nine babies were available for examination during the active stage of the disease, and *Bact. coli* D 433 was isolated from all of them. Five had developed symptoms after discharge from the maternity unit and were readmitted for treatment in the emergency gastro-enteritis unit. The duration of illness at the time of swabbing varied from two to five days. In eight cases the strain was isolated from the rectal swabs and in one case from the upper respiratory tract only.

Group B

A severe and sudden outbreak of diarrhoea and vomiting occurred in a mothers and babies' hostel in Middlesex between Sept. 7 and 18, 1947. The hostel has accommodation for 14 mothers and their babies. They are usually admitted direct from maternity hospitals after the lying-in period. The babies are cared for by their mothers under the supervision of a small staff of nurses. Of the 12 babies living in the hostel at the time 11 developed the disease. The one baby who remained healthy was fully breast-fed. The others were all bottle-fed babies who had thrived since birth and were in good health at the start of the outbreak. Their age distribution was as follows: under 1 month, 3; 1 month, 3; 2 months, 2; 3 months, 2; 4 months, 1. One other baby, the 9-months-old non-resident child of the daily cleaner, also contracted diarrhoea and vomiting; he was taken into the kitchen each day for his midday meal.

The main symptoms were diarrhoea and vomiting, with dehydration. In several cases the onset was heralded by lethargy and reluctance to take feeds. The stools were green and watery, with mucus but no blood (except as a terminal event in one fatal case). Vomiting occurred in all but two cases; it was severe in four. There was no evidence of parenteral infection at the start of the illness, but secondary infection occurred in several cases during its course. Some degree of dehydration occurred in all the 12 cases; it was slight in two and severe in the remainder. Two cases may therefore be classed as mild and 10 as severe. Seven babies were given intravenous therapy, and these recovered. There were three deaths.

Rectal swabs were taken, at times varying from the second to the eighth day of illness, from 10 of the 12 sick babies in this outbreak. *Bact. coli* D 433 was present in all of them.

Group C

A second and less severe outbreak of diarrhoea and vomiting occurred in the same hostel eight months after that of Group B. Eight of the 17 babies exposed to infection developed the disease between May 13 and June 6, 1948. Seven of the eight were bottle-fed, and one, a mild case, was breast-fed. Seven of the babies were 1 month old and one was 2 months. The clinical features were similar to those of the previous outbreak, but with two exceptions the cases were comparatively mild.

The onset of illness was more insidious than in the previous outbreak, and in three cases was characterized by lethargy and reluctance to feed. The stools were green and mucoid—watery in the severe cases and relaxed in the mild ones. Vomiting occurred, but was never a severe feature. Three of the babies had no more than slight diarrhoea of a few days' duration, accompanied in one by loss of weight and in the others by a temporary interruption of weight gain. Ordinarily these very mild cases might not have been regarded as infective diarrhoea, but it was considered that they were part of the outbreak and therefore mild examples of the disease. The remaining five babies were more severely ill; two became dehydrated, and one of these died.

Bact. coli D 433 was isolated from the rectal swabs of the eight babies with diarrhoea and vomiting. The swabs were taken in five cases on the first, second, or third day of illness, and in the other three cases on the twelfth, fourteenth, and fifteenth days. Rectal swabs had been taken from three babies before the onset of symptoms. *Bact. coli* D 433 was isolated from one baby on seven occasions during the nine days preceding onset and from the other two babies on the preceding one and four days.

Group D

An investigation was made of an outbreak of diarrhoea and vomiting in a residential nursery in Hertfordshire. It has accommodation for 40 children, including a nursery unit for 12 babies. At the end of December, 1947, two babies died from diarrhoea and vomiting; these are not included in the series. Four others developed the disease between Feb. 13 and 15, 1948. They were all bottle-fed. Their ages were as follows: 1 month, 1; 2 months, 2; 3 months, 1. The symptoms were severe diarrhoea with green watery mucoid stools and vomiting. No parenteral infection was found at the start of the illness. All the babies became dehydrated. One baby died after an illness of eight days.

Bact. coli D 433 was present in the rectal swabs of the four cases. The swabs were taken from the fourth to the sixth day of the illness.

Group E

An investigation was made of 23 babies who developed intercurrent diarrhoea and vomiting while undergoing in-patient treatment in a children's hospital in London. The occurrence of seven cases in one ward during a period of two months, and of two or three cases in quick succession in three other wards, suggested the possibility that some, if not all, of them were of an infective type. The babies were all nursed in single-cot cells.

The period of study was from late January to early May, 1948. The babies were all bottle-fed or on mixed feeding. Their ages were as follows: under 3 months, 5; 3 to 5 months, 8; 6 to 8 months, 6; 9 to 11 months, 3; over 1 year, 1. They had been admitted to hospital for a variety of conditions—i.e., feeding difficulty, rumination, congenital defect, eczema, surgical operation, etc. The attack of diarrhoea and vomiting was characterized by the onset of watery diarrhoea, accompanied in most cases by vomiting. Parenteral infection at onset was found in only two cases. Seventeen of the babies became severely ill and 16 were given intravenous therapy; the other babies had moderate or mild attacks. Two of the babies died.

Bact. coli D 433 was present in the rectal swabs of 21 of the 23 cases of intercurrent diarrhoea and vomiting. The swabs were taken at times varying from the first to the ninth day of illness.

Group F

An investigation was made of 26 cases of diarrhoea and vomiting admitted consecutively between Feb. 4 and March 31, 1948, to the gastro-enteritis unit of a children's hospital in London. The unit consists of one double-cot and eight single-cot cells. Twelve of the 26 babies had developed intercurrent diarrhoea and vomiting while in other wards of the hospital or shortly after their discharge from them. These cases have already been included in Group E.

The other 14 infants with diarrhoea and vomiting were admitted from outside at the request of medical practitioners. They were all bottle-fed or on mixed feeding. Their ages were as follows: under 3 months, 5; 3 to 5 months, 3; 6 to 8 months, 4; over 1 year, 2. On admission nine of the babies had been ill for periods varying from one to six days and five for three weeks or more; three had suppurative otitis media, one severe proctitis, and one a history of recent coryza. Seven were severely ill and were given intravenous therapy.

Bact. coli D 433 was present in the rectal swabs of six of the 14 cases; with few exceptions the swabs were taken on the day of admission to the unit. Of these six babies three had contracted diarrhoea and vomiting in other hospitals, two during outbreaks in residential nurseries, and one, a sporadic case, at home. The eight babies from whom the strain was not isolated had developed the disease at home.

Group G

An investigation was made of 24 cases of diarrhoea and vomiting admitted consecutively during May, 1948, to a gastro-enteritis unit, consisting of 48 single-cot cells, in a London infectious diseases hospital. From each baby a rectal swab was taken in the receiving-room before admission to the unit, and a nasopharyngeal and repeat rectal swab on the following day within the unit.

Two of the 24 babies were partially breast-fed; the remainder were either bottle-fed or on a mixed diet. Their ages were as follows: under 3 months, 7; 3 to 5 months, 11; 6 to 8 months, 3; 9 to 11 months, 3. Three had contracted the disease while in another hospital, four while in a residential nursery, and 17 at home. A history of contact with other cases of infantile diarrhoea and vomiting was found in nine instances.

The clinical picture and the severity varied considerably. Diarrhoea was the main symptom in all cases, and vomiting occurred in all but a few, although it was marked in only five. Parenteral infection was found on admission in eight babies (upper respiratory tract infection, 5; bronchopneumonia, 2; vaccination reaction, 1). On admission 17 cases were classified as mild and seven as severe; in the latter group six were sufficiently dehydrated to need intravenous therapy. Seventeen made uneventful recoveries, four (one of whom died) had severe relapses, and three developed secondary parenteral infections (bronchopneumonia, 2; skin sepsis, 1).

Twenty-one of the 24 babies were admitted during the first week of the disease, two in the second week, and one, with a relapse and pneumonia, in the seventh week. *Bact. coli* D 433 was present on admission in three of the seven severe cases and in two of the 17 mild ones. There were no obvious clinical features to distinguish those cases in which the strain was found. Two of the five babies in whom *Bact. coli* D 433 was present had contracted diarrhoea and vomiting while undergoing treatment in another hospital; the other three were admitted direct from home.

Group H

A mild type of endemic infantile diarrhoea and vomiting was investigated in a large residential nursery in London. Accommodation is provided for 120 children under 3 years of age, including about 40 bottle-fed or breast-fed babies. There is a large turnover of children, with frequent admissions and discharges. On arrival some of the babies are in poor physical condition and are under weight. Rises in incidence of the endemic diarrhoea and vomiting occur from time to time. A period of comparative freedom from the disease was followed by an increase in the number of cases during March and April, 1948.

Investigations were made of 14 cases occurring consecutively during this time. The babies affected were all either bottle-fed or on mixed feeding. Their ages were as follows: under 3 months, 8; 3 to 5 months, 3; 6 to 8 months, 1; 9 to 11 months, 1; over 1 year, 1. Diarrhoea and vomiting, usually of insidious onset, were the main symptoms. Parenteral infections at this stage were found in only two of the babies. Eight showed clinical evidence of dehydration, but only three were severely ill. There were no deaths.

Rectal swabs were taken from the 14 babies at times varying from the first to the sixth day of illness. No *Bact. coli* D 433 was isolated from them.

Control Groups of Babies

Rectal swabs were taken from a control series of 208 babies (Groups K and L). Their ages were as follows: under 3 months, 122 (including 79 under 1 month); 3 to 5 months, 42; 6 to 8 months, 35; 9 to 11 months, 9. Seventy-seven were breast-fed, 43 partially breast-fed, and 88 either bottle-fed or on mixed feeding. Those who had received no more supplementary feeding than water or glucose feeds during their early days have been included in the breast-fed group.

Group K: Healthy Babies.—One hundred and seventy-five healthy babies were examined during the period February–June, 1948. Sixty-seven of them were attending infant-welfare clinics in North and South London, 29 were in residential nurseries in North London and in Hertfordshire, 10 were attending clinics for congenital defects in Central London, and 69 were in the newborn babies' nurseries of three maternity hospitals in East and North London and in Middlesex. No *Bact. coli* D 433 was isolated from the rectal swabs of these 175 babies. After an interval of at least two weeks an inquiry was made about the progress of each baby. Thirteen of them could not be traced. None of the other 162 had developed diarrhoea and vomiting, but it was reported that six neonatal babies had had mild digestive disturbances with relaxed stools.

Group L: Sick Babies.—Thirty-three sick babies were swabbed in the receiving-room of a children's hospital in London immediately before their admission for conditions other than diarrhoea and vomiting. Seventeen of them were examined in May and June, 1948, and 16 in October and November, 1948. No *Bact. coli* D 433 was isolated from their rectal swabs. The clinical progress of each baby was followed for a fortnight after admission; none of them developed diarrhoea and vomiting during this time, but five of them had some relaxed stools while in hospital.

Incidence of Bact. coli D 433

The accompanying Table shows that *Bact. coli* D 433 was present in all the 31 cases of infective diarrhoea and vomiting which were swabbed in four outbreaks of the disease

Table showing Incidence of Bact. coli D 433 in Cases of Diarrhoea and Vomiting and in Control Groups of Babies

Group	Place	Description of Group	No. of Babies Swabbed	Bact. coli D 433	
				No. of Babies Positive	Percentage of Babies Positive
A	Maternity unit	Epidemic diarrhoea of the newborn. 20 cases. 14 deaths	9	9	100
B	Mothers and babies' hostel	Severe outbreak. 12 cases. 3 deaths	10	10	100
C	Mothers and babies' hostel	Second and less severe outbreak in same hostel as Group B. 8 cases. 1 death	8	8	100
D	Residential nursery	Severe outbreak. 4 cases. 1 death	4	4	100
E	Children's hospital	Intercurrent cases among sick babies. 17 severe and 6 moderate or mild cases. 2 deaths	23	21	91
F	Gastro-enteritis unit 1 (children's hospital)	Routine admissions. 7 severe and 7 moderate or mild cases. No deaths	14	6	43
G	Gastro-enteritis unit 2 (infectious diseases hospital)	Routine admissions. 7 severe and 17 mild cases. 1 death	24	5	21
H	Residential nursery	Endemic diarrhoea and vomiting. 3 severe and 11 mild cases. No deaths	14	0	0
K	Clinics, maternity units, and residential nurseries	Healthy babies	175	0	0
L	Receiving-room of children's hospital	Sick babies on admission for conditions other than diarrhoea and vomiting	33	0	0

(Groups A–D) and in 21 out of 23 intercurrent cases in a children's hospital (Group E). The strain was not, on the other hand, isolated from any of the 14 cases of endemic diarrhoea and vomiting in a large residential nursery (Group H). *Bact. coli* D 433 was present in six of the 14 cases admitted direct to gastro-enteritis unit 1 (Group F), but was found in only five of the 24 cases admitted to gastro-enteritis unit 2 (Group G). It was not isolated from any babies in the control group, which consisted of 175 healthy babies and of 33 sick babies suffering from conditions other than diarrhoea and vomiting.

The great majority of the babies from whom *Bact. coli* D 433 was isolated had severe attacks of diarrhoea and

vomiting, with enough dehydration to need intravenous therapy. Some of the cases in which it was found were, however, mild examples of the disease.

An analysis of the age distribution of the 63 babies in whom *Bact. coli* D 433 was present gave the following results: under 3 months, 33; 3 to 5 months, 15; 6 to 8 months, 11; 9 to 11 months, 4. The first age group included 13 babies in the neonatal period, eight of whom were involved in the outbreak of epidemic diarrhoea of the newborn (Group A). The ages of the babies in the outbreak of Group B were of interest in that they ranged from 25 days to 9 months. The limits of age, taking the whole series of cases showing *Bact. coli* D 433, was 10 days for the youngest baby and 11 months for the oldest.

Further Observations on Cases

1. *Necropsies.*—Post-mortem examinations were carried out on 13 babies of Groups A–E. The seven neonatal babies all showed hyperaemia of the intestines, particularly of the small intestine; in all but one case there was some enlargement of the mesenteric glands. Two small membranous lesions of the gastric mucosa were found in one of these seven babies, and a few large superficial erosions of the small intestine in another. No evidence of parenteral infection other than one case of early bronchopneumonia was found. Among the group of six older babies four showed some hyperaemia of the small and large intestines; the alimentary tract of the other two appeared normal. In five of these cases the liver showed fatty change. The only parenteral infections found were pneumonia and mastoiditis in one case. A sample of the contents of the small intestine was taken at necropsy from four of the neonatal and three of the older babies. *Bact. coli* D 433 was present in all these specimens. It was also present in the mastoid antra of the baby with mastoiditis. The interval from the onset of diarrhoea and vomiting to death varied from three to 27 days. One of the 13 dead babies had not been swabbed during life.

2. *Nasopharyngeal Swabs.*—Nasopharyngeal as well as rectal swabs were taken from 88 of the babies suffering from diarrhoea and vomiting. *Bact. coli* D 433 was isolated from the nasopharyngeal swabs in 12 cases; 11 of these yielded the strain in the rectal swabs also. Five of these 12 were suffering from epidemic diarrhoea of the newborn (Group A).

3. *Chemotherapy.*—Sixteen babies were on courses of sulphonamides (sulphadiazine, sulphamezathine, sulphasuxidine, or phthalyl sulphathiazole) and three on penicillin treatment when *Bact. coli* D 433 was isolated from their rectal swabs.

4. *Infant Feeding.*—An analysis was made of the feeding of those babies from whom *Bact. coli* D 433 had been isolated. It was found that on the day of swabbing and during the previous few days they had received a variety of dried-milk preparations to which had been added sucrose, glucose, lactose, or dextrimaltose. Expressed breast milk or diluted Hartmann's fluid had been given to a few of them. Two of the babies were fully breast-fed and three partially breast-fed.

5. *Later Swabbing of Babies with Diarrhoea and Vomiting*

(a) Clinical Progress and Bact. coli. D 433.—In gastro-enteritis unit 1 a study was made of the association between the clinical progress of the cases and the finding of *Bact. coli* D 433. From the 20 babies concerned, rectal swabs were taken on admission and on each subsequent Monday from early February to the end of March, 1948. Eight of the babies were negative to *Bact. coli* D 433 on admission and six of these became positive during their illness. The first positive swab was discovered at times varying from the 10th to the 30th day after admission. The finding of *Bact. coli* D 433 was in one case associated with a severe exacerbation of diarrhoea and in three others with mild relapses. Of 12 babies who were positive to *Bact. coli* D 433 on admission nine became negative during their stay in the unit. The stools of three had settled by this time, but those of the other six were still relaxed. The first negative swab occurred at times varying from the ninth to the 34th day of illness.

(b) Re-examination of Cases in Groups A–D.—Eighteen other babies (Groups A–D) from whom *Bact. coli* D 433 had been isolated in the first swab were re-examined during the course of their illness. It was not possible to correlate exactly the clinical progress of the cases with the finding of *Bact. coli* D 433. It was observed, however, that in some cases loose stools continued after the rectal swabs had become negative, and that in others the stools had settled while the result was still positive.

(c) Clinical Relapses.—Four babies admitted to gastro-enteritis unit 2 during April and May, 1948, had at first mild or moderate attacks of diarrhoea and vomiting, accompanied in one case by bronchopneumonia. While in hospital they had relapses of their diarrhoea and vomiting, during which they all became dehydrated. Three were given intravenous therapy and one of them died. *Bact. coli* D 433 was not isolated from their rectal swabs during the initial attacks, but was present in all four during their relapses.

6. *Cases Other than Diarrhoea and Vomiting.*—During the course of the investigation 14 babies admitted to the gastro-enteritis units were found to have illnesses other than diarrhoea and vomiting. No *Bact. coli* D 433 was isolated from their rectal swabs.

7. *Other Outbreaks of Diarrhoea and Vomiting.*—*Bact. coli* D 433 was present in rectal swabs or stools received from a limited number of cases of diarrhoea and vomiting which occurred in other outbreaks during 1948. The residential nurseries in which they arose were situated in three counties. The results of these examinations, taken together with those listed in the Table, show a distribution of *Bact. coli* D 433 over a wide area. In all, it was isolated from cases of diarrhoea and vomiting in Derbyshire, Middlesex, Hertfordshire, Berkshire, Leicestershire, Sussex, and London.

Adult and Baby Contacts

A number of adult and baby contacts of infective diarrhoea and vomiting were examined for the presence of *Bact. coli* D 433 in their faeces or rectal swabs. Some individuals were direct contacts and others were indirect contacts exposed only to mediate infection or to possible carriers of the infecting agent.

Adult Contacts.—Faeces (or rectal swabs) were obtained from 84 adult contacts of infantile diarrhoea and vomiting. Specimens were taken, usually once only from each person, either during or shortly after an outbreak of the disease. Four of the contacts reported diarrhoeal attacks during the course of the investigation of Groups A, B, and H. No *Bact. coli* D 433 was found in their specimens, but in two instances the diarrhoea was not reported until recovery was complete. The other 80 adult contacts were associated with Groups B, C, D, and E, and none of them reported any attack of diarrhoea. *Bact. coli* D 433 was isolated from only four of these 80 persons—a daily cleaner whose baby had an attack of diarrhoea and vomiting, a laundress whose duties included the washing of soiled napkins, and two mothers, one of whom

was the mother of a case. On re-examination of the laundress and the cleaner six and 11 days later, respectively, no *Bact. coli* D 433 was found in their faeces.

Baby Contacts.—Rectal swabs were taken from 34 baby contacts of cases of diarrhoea and vomiting from which *Bact. coli* D 433 had been isolated. Eleven of the baby contacts were associated with the neonatal outbreak (Group A), nine with the outbreaks in the mothers and babies' hostel (Groups B and C), seven with that in a residential nursery (Group D), and seven with cases of intercurrent diarrhoea and vomiting in a hospital ward (Group E). The rectal swabs were obtained once only from 26 of the baby contacts and on several occasions from the other eight. Nine of the 34 baby contacts were positive to *Bact. coli* D 433. Three of these nine were associated with Group A, one with Group B, and five with Group C. Four of the nine babies were breast-fed, two partially breast-fed, and three bottle-fed. The remaining 25 were negative to *Bact. coli* D 433; seven of these were breast-fed, four were partially breast-fed, and 14 either bottle-fed or on mixed feeding. The progress of the 34 babies was followed for a further fortnight, and all remained free from diarrhoea and vomiting. Rectal swabs were also taken from 28 baby contacts of cases of endemic diarrhoea and vomiting (Group H) in a residential nursery. No *Bact. coli* D 433 had been isolated from the babies suffering from the disease and none was found among the baby contacts.

Subsequent Investigations in Nurseries and Hospital Wards

Rectal swabs were taken some months later from infant occupants of the nurseries and wards in which cases of diarrhoea and vomiting associated with *Bact. coli* D 433 had been investigated. The groups present at the later date consisted, with few exceptions, of different babies from those originally there.

(*a*) On three occasions examinations were made of groups of babies in the maternity nurseries in which epidemic diarrhoea of the newborn (Group A) had occurred in February–March, 1948. (1) Three months after the outbreak, in June, 1947, 20 neonatal babies in the nurseries were swabbed. No *Bact. coli* D 433 was isolated from them. Their subsequent progress was not followed. (2) Fourteen and 17 months after the outbreak, in May and August, 1948, two further groups of neonatal babies in these nurseries were examined. The groups consisted of 21 and 30 babies respectively, making a total of 51. The results were unexpected, for a strain of *Bact. coli* which was closely related antigenically to *Bact. coli* D 433 but which failed to produce gas in "sugars" was isolated from 21 of them. Particulars of this anaerogenic strain are given below. A clinical follow-up of the 51 babies was made 2½ weeks after each swabbing. Fourteen had suffered from mild transient diarrhoea; from 10 of these 14 the anaerogenic strain had been isolated. It was evident that the babies were free from severe epidemic diarrhoea of the newborn. It is uncertain whether any significance should be attached to these minor diarrhoeal attacks, which may possibly have been no more than digestive disturbances common in the neonatal period.

(*b*) The infant community of the mothers and babies' hostel were swabbed three months after the second outbreak of diarrhoea and vomiting (Group C) and that of the residential nursery in Hertfordshire three and six months after the outbreak (Group D). There had been no cases of diarrhoea and vomiting in the intervening months. The number of babies present was 13, 10, and 8 respectively. No *Bact. coli* D 433 was isolated from the rectal swabs. Progress reports for the ensuing fortnight showed that none of the babies developed diarrhoea and vomiting during this time.

(*c*) Thirty-one sick babies accommodated in wards where intercurrent diarrhoea and vomiting had occurred in January–May, 1948, were swabbed in August, 1948. The intervening period had been a quiescent one. No *Bact. coli* D 433 was isolated from the rectal swabs of these babies. Their clinical records for the following fortnight showed that one of them had developed diarrhoea and vomiting during this time, and that the others had remained free from the disease.

Report of Virus Investigations by Dr. F. O. MacCallum

Attempts made to isolate a virus from material obtained from four fatal cases of diarrhoea and vomiting yielded negative results.

1. Post-mortem material was obtained from two babies, aged 9 and 17 days, who had died from epidemic diarrhoea of the newborn (Group A). They had been ill for three and five days respectively. Suspensions of brain, small intestine, and intestinal contents were filtered through collodion membranes which had an A.P.D. of 750 mμ. The filtrates were then inoculated into mice, cotton-rats, guinea-pigs, and young swine. Intracerebral passages were made, using 100 mice. The mice were killed after various intervals and brain suspensions injected into further mice. Eight passages were made, with negative results. Six intracerebral passages using 18 guinea-pigs were negative. Four intranasal passages, using 20 guinea-pigs, of the consolidated lung of an intracerebrally inoculated guinea-pig were negative. Four intracerebral passages using 20 cotton-rats were negative. The original swine were inoculated intranasally and orally, and then three passages were carried out with brain intracerebrally, with lung intranasally, and with intestine orally. Seventeen swine were used, and the results were negative.

2. Post-mortem material was obtained from twin babies, aged 3 months, who had died from diarrhoea and vomiting (Group B). They had been ill for 7 and 8 days. Mice were inoculated intracerebrally with brain, intranasally with lung, and orally with intestine. The material was unfiltered. Two passages using 16 mice gave negative results. Similar inoculations in four cotton-rats and four young rabbits gave negative results. Three passages in 18 guinea-pigs were negative.

General Bacteriological Investigations

The number of cases of infantile diarrhoea and vomiting listed in the Table is 106. Rectal swabs from 85 of these were examined on two to four occasions for non-lactose-fermenters and from 18 on one occasion only. Nasopharyngeal and rectal swabs from 88 of the 106 cases were submitted to general bacteriological examination.

Nasopharyngeal swabs consisted of curved swabs which were passed under the uvula to the posterior pharyngeal wall. They were inoculated on to horse-blood–digest-agar plates, which were incubated aerobically. In most cases rectal swabs were taken through a narrow glass anal cannula for their protection from skin contamination. Culture media used were horse-blood digest agar (one plate incubated aerobically and one anaerobically), horse-blood digest agar + 1 in 1,000 chloral hydrate for inhibition of swarming by *Proteus* (Gillespie, 1948), plain digest agar + 7.5% NaCl for isolation of staphylococci (Chapman, 1945), and desoxycholate-citrate medium (Hynes, 1942) or Difco "bacto S S" agar for isolation of non-lactose-fermenters.

No salmonellae or shigellae were isolated from the rectal swabs of the 103 cases examined for non-lactose-fermenters. Thirty-six of the 88 babies from whom nasopharyngeal and rectal swabs were taken had, prior to swabbing, either had diarrhoea and vomiting for more than seven days or had received chemotherapeutic drugs. They have therefore been excluded from the following analysis of the general bacteriological results. The swabs from the remaining 52 babies were taken in 18 cases on the first or second day

of illness, in 21 on the third or fourth day, in 11 on the fifth or sixth day, and in 2 on the seventh day. The distribution of organisms in the 52 nasopharyngeal swab cultures was as follows: alpha- and non-haemolytic streptococci, 48; *Staph. pyogenes*, 30; *Neisseria*, 23; *Bact. coli*, 18; diphtheroids, 7; *Haemophilus*, 5; pneumococcus, 5; yeasts, 3; aerobic spore-bearing bacillus, 1; *Chromobacterium*, 1; paracolon bacillus, 1. The distribution of organisms in the 52 rectal swabs was as follows: *Bact. coli*, 50; *Streptococcus*, 41; *Staph. pyogenes*, 16; *Proteus*, 16; *Lactobacillus*, 15; *Micrococcus*, 15; paracolon bacilli, 5; *Fusiformis*, 3; *Clostridium*, 2; yeasts, 2; aerobic spore-bearing bacillus, 1.

Bact. coli was present in abundance in 47 of the 52 rectal swabs. The detailed examination of the *Bact. coli* strains is described below. Organisms of the *Proteus* group were isolated from 16 of the 52 rectal swabs, but in abundance from only 11 cases. *Proteus* was not isolated from any of the babies with epidemic diarrhoea of the newborn (Group A) or from those with diarrhoea and vomiting in two other outbreaks (Groups B and C). It was, on the other hand, present in the rectal swabs of all the babies in Group D, but it was also present in the seven unaffected baby contacts in this outbreak.

Only seven of the 14 cases with endemic diarrhoea and vomiting (Group H) were suitable for inclusion in the general bacteriological analysis, and *Proteus* was grown from the rectal swabs of three of them; the organism was also found in 16 of the 28 baby contacts in the nursery. Paracolon bacilli were present in the rectal swabs of five of the 52 babies; three of these five were suffering from epidemic diarrhoea of the newborn. Paracolon bacilli were isolated from the nasopharyngeal swab of one of them. *Staph. pyogenes* (i.e., coagulase-positive staphylococci) was present in the nasopharyngeal swabs of 30 and in the rectal swabs of 16 babies; in 15 of the latter it was isolated from the nasopharyngeal swabs also.

Staph. pyogenes strains isolated from the cases of the first two outbreaks (Groups A and B) were examined for phage type by Dr. V. D. Allison. The distribution of the phage types in the nasopharyngeal swabs was type 7/47 (one baby), type 47 (one), type 52A (one), and type not found (five); in the rectal swabs it was type 7/47 (one), type 47 (one), type 52 (one), type 52A (one), and type not found (two). On account of the variety of phage types in the first two outbreaks, and of the low incidence and sparsity of *Staph. pyogenes* in the rectal swabs in general, phage typing was not continued. The phage types determined in the first two outbreaks were not those commonly found in staphylococcal food-poisoning outbreaks—i.e., type 6/47 and type 42D (Allison, 1949).

Gale (1944) found large numbers of Group D streptococci with an unusually high tyrosine decarboxylase activity in the stools of cases in certain outbreaks of neonatal diarrhoea. A detailed examination was therefore made by Dr. P. M. F. Shattock and Miss M. E. Sharpe of streptococci isolated from the babies with epidemic diarrhoea of the newborn. Group D streptococci in small numbers were isolated from the rectal swabs of only three of these babies. Nine strains derived during this outbreak from these rectal swabs and from the intestinal contents of two other babies after death, together with two strains from the upper respiratory tract, were examined. They were found to be: *Str. faecalis*, 3; *Str. faecalis* var. *liquefaciens*, 3; *Str. faecalis* var. *zymogenes*, 3; unclassified, 2. These strains were found to be of several serological types. Their tyrosine decarboxylase activity varied from a high figure to *nil*. Scanty Group B streptococci were isolated from the rectal swabs of two other neonatal cases in this outbreak. *Clostridium* was found in only two of the 52 rectal swabs.

Thirty-four stools from cases of diarrhoea and vomiting were examined microscopically. Abundant bacteria were seen, varying numbers of epithelial cells, rarely more than a few leucocytes, and very occasionally a few red blood cells. No flagellate protozoa were observed. Stools from the 24 cases admitted to gastro-enteritis unit 2 (Group G) were examined for *Giardia lamblia*, each on two occasions, by Mr. L. G. C. Maslen, but none was found. The ether concentration method was used.

Blood was taken, at times varying from the second to the seventh day of illness, from the internal jugular vein of eight babies with *Bact. coli* D 433 in their rectal swabs. Six had severe and two moderate or mild attacks of diarrhoea and vomiting. Cultures were prepared in liquoid digest broth and incubated aerobically, anaerobically, and under CO_2 at 37° C. for 14 days. With the exception of two contaminated anaerobic cultures, no growth was found.

In summarizing the general bacteriological results of the rectal swabs it may therefore be said that no recognized pathogen was isolated, that *Proteus* and *Staph. pyogenes* (of phage types other than those of food-poisoning staphylococci) were each present in about one-third of the cases, that *Clostridium* was rarely found, and that Group D streptococci were not conspicuous in the outbreak of epidemic diarrhoea of the newborn. *Bact. coli* was the most frequently occurring organism, and, with the exception of a profuse growth of *Lactobacillus*, *Proteus*, or *Streptococcus* on some plates, it yielded the most abundant growth.

Serological and Other Investigations of Bact. coli Strains

Lovell (1937), working on the types of *Bact. coli* isolated from diseased calves, identified his strains by the precipitin reaction. Bray (1945), using the agglutination reaction suitable for the identification of the somatic antigen, isolated a particular serological type of *Bact. coli* var. *neapolitanum* from cases of infantile "summer diarrhoea." Kauffmann and his collaborators, using agglutination tests, identified the O or somatic, the H or flagellar, and the K antigens of the *Bact. coli* group: the K antigen may be of the L type (surface) or A or B types (capsular or surface), which are distinguished by their susceptibility to heat treatment. These workers were able to establish a diagnostic coli antigenic schema of O groups, subdivided into types and classified by their O, H, and K antigens. Giles and Sangster (1948) used their techniques for the identification of a serologically homogeneous strain of *Bact. coli* from over 90% of their cases of gastro-enteritis. Detailed information regarding the serology of the coli group may be found in the review of the subject by Kauffmann (1947) and the monographs by Vahlne (1945) and by Knipschildt (1945).

The methods used by these Scandinavian workers have been followed for the examination of *Bact. coli* strains isolated in this investigation. The first strains of *Bact. coli* to be investigated were derived from the outbreak of epidemic diarrhoea of the newborn (Group A). Primary blood-agar plates were inoculated with nasal, nasopharyngeal, throat, and rectal swabs taken from nine babies in the active stage of the disease, two in the convalescent stage, 11 baby contacts, and four babies at first suspected of epidemic diarrhoea of the newborn but later found to have ailments other than this; the intestinal contents of four babies who died from epidemic diarrhoea of the newborn were taken at necropsy and similarly plated. Colonies suggestive of *Bact. coli* were picked from all those

plates on which they were found, the number picked depending on the number of colonial forms present. Each strain was then tested for its fermentation reactions on a variety of "sugars," the production of indole, urease, and H_2S, utilization of citrate, Voges-Proskauer and methyl red reactions, liquefaction of gelatin, gas production at 44° C., and haemolysis (using the method described by Vahlne). In this way 178 strains of *Bact. coli* were isolated. The subsequent serological investigation of these strains will be described later.

For the preparation of sera, eight strains of *Bact. coli* isolated from active cases of epidemic diarrhoea of the newborn (Group A) were used. Six of these strains had been isolated from the rectal swabs of six babies, one from the nasopharynx of one of these babies, and one from a subcutaneous abscess of another of them. This abscess had formed at the site of a subcutaneous injection. These eight strains were chosen because in their biochemical reactions they showed some slight variation from one another and were representative of other strains found.

O sera were made in rabbits, using as antigen an overnight broth culture steamed for 2½ hours. K sera were made, using a living culture which had grown overnight on a thick 0.1% glucose-agar plate, a suspension of about 500 millions per ml. in quarter-strength Ringer solution being employed as inoculum. O and K sera were made from each of the eight strains. One of the rectal strains was motile, and from this an H serum was made using a formolized overnight broth culture. Thus, a total of 17 sera were prepared. Cross-agglutination and reciprocal-agglutination absorption reactions were carried out between these 17 sera and the eight strains of *Bact. coli* used for their production. From the results obtained it was obvious that five of the strains were serologically identical; of these, three had been isolated from rectal swabs and the fourth and fifth from the nasopharynx and rectal swab respectively of another baby.

This serological type is referred to as *Bact. coli* D 433. It is non-motile, therefore O and K sera only were used for its identification. It was tested with *Bact. coli* sera kindly supplied by Dr. G. Vahlne, and was found to be different from any of the 25 O groups of the diagnostic coli antigenic schema of Kauffmann, Knipschildt, and Vahlne. The organism is not capsulated, so that the A antigen was not considered. The presence of an L antigen could not be demonstrated, but a B antigen may be present, though more work is needed for the proof of this point. Dr. F. Kauffmann in a personal communication states that he believes *Bact. coli* D 433 has a surface antigen of the B type and that both the O and the B antigens differ from those of other strains in the schema. The strain of *Bact. coli* isolated by Giles and Sangster (1948) was tested and found to be identical with *Bact. coli* D 433.

The titre of the *Bact. coli* D 433 O serum was 1 in 6,400 and of the *Bact. coli* D 433 K serum 1 in 800. It was considered that these titres were high enough to show any differences between *Bact. coli* D 433 and related serological types which might subsequently be investigated. All the 178 strains already isolated in connexion with the outbreak of epidemic diarrhoea of the newborn (Group A) were then tested against each of the 17 sera. The results suggested that *Bact. coli* D 433 might be related to the outbreak in that it was isolated from the nine active cases examined, from the four cases at necropsy, and from three of 11 contacts; it was not isolated from the two convalescent cases of the disease or from the four cases other than epidemic diarrhoea of the newborn.

The *Bact. coli* D 433 O and K sera, already prepared with strains from cases of epidemic diarrhoea of the newborn, were used for the subsequent identification of *Bact. coli* D 433 among the sick babies and contacts and controls of Groups B–L. Material from these babies was plated on blood-agar. From all plates on which "coliform" colonies appeared four discrete colonies were tested with *Bact. coli* D 433 K serum by the slide-agglutination method. One agglutinable colony was then taken from each "positive" plate and its characteristics investigated. Without serological tests it was not possible to identify colonies of *Bact. coli* D 433 either on blood agar or on desoxycholate-citrate–agar plates. If *Bact. coli* D 433 colonies were overgrown with *Proteus* they were sometimes found to be inagglutinable by the slide method. In this event it was usual to test discrete colonies on duplicate primary plates of blood agar + 1 in 1,000 chloral hydrate; if these were not available, colonies subcultured on to this medium from the primary blood-agar plates were tested.

In all, 133 cultures of *Bact. coli* D 433 were investigated; they were derived from clinical cases of diarrhoea and vomiting and their contacts. All the strains were non-motile. All fermented lactose, glucose, maltose, mannitol, and sorbitol, with the production of acid and gas, after overnight incubation at 37° C. The fermentation of sucrose, salicin, and dulcitol was occasionally rather slower, but the majority of strains gave acid and gas in these "sugars" in four days. All strains were V.P.−, M.R.+, produced indole, failed to utilize citrate, gave acid and gas in MacConkey broth when grown at 44° C., and failed to liquefy gelatin or to produce H_2S. The large majority of the strains when grown on 10% horse-blood–agar plates showed no ring of haemolysis round well-isolated colonies, though there was always haemolysis in the area of confluent growth. Each strain was subjected to the haemolysis test; only six strains gave a positive result. All strains were agglutinated to titre by *Bact. coli* D 433 K and O sera. Representative strains from each group of babies investigated were used for absorption tests and completely removed all agglutinins to the homologous strain.

We have already stated that an anaerogenic strain of *Bact. coli* was isolated from a number of newly born babies accommodated in the maternity nurseries where over a year before epidemic diarrhoea of the newborn had occurred. This strain produced acid but no gas in lactose, glucose, maltose, mannitol, and sorbitol, failed to ferment sucrose and dulcitol, and gave variable reactions in salicin. The other biochemical reactions were the same as those of *Bact. coli* D 433. The O and K antigens of the two strains were identical, but the anaerogenic strain possessed in addition an H antigen and in this respect differed from *Bact. coli* D 433.

Four motile aerogenic strains of *Bact. coli* having the O and K antigens of *Bact. coli* D 433 were isolated during the investigation. These strains were derived from the rectal swabs of four babies, two of whom had mild attacks of diarrhoea and vomiting and were included in Group E and Group H respectively. The other two were healthy babies. The first of these was included in Group K (healthy controls) and the second was among the neonatal babies swabbed in the maternity nursery where epidemic diarrhoea of the newborn had occurred 14 months previously; their progress reports for 2½ weeks after swabbing showed that they remained free from diarrhoea and vomiting during this period. The biochemical reactions of these strains showed no constant difference from those of *Bact. coli* D 433, though two strains failed to ferment maltose in

24 hours but did so later. In view of their motility these strains have not been classed as *Bact. coli* D 433. It has not been possible to assess their significance, particularly as they have been so few in number.

Thirteen strains of *Bact. coli* isolated from calf scours were tested. The biochemical reactions of some strains were similar to those of *Bact. coli* D 433, but all the strains differed from it serologically.

Pathogenicity tests were carried out, using 18-hour broth cultures of *Bact. coli* strains, by intravenous and intraperitoneal inoculation, with and without mucin, of mice of various ages and by the intramuscular inoculation of guinea-pigs. One strain of *Bact. coli* D 433, two strains from calf scours, one strain from a subcutaneous abscess, and one strain from a healthy child were tested. All the strains were pathogenic to animals, but no marked difference in degree of pathogenicity could be detected between them.

Discussion

Among over a hundred cases of infantile diarrhoea and vomiting no recognized intestinal pathogen was detected and virus studies of four fatal cases yielded negative results. A serological type of *Bact. coli*, referred to as *Bact. coli* D 433, was first identified during an outbreak of epidemic diarrhoea of the newborn in a maternity unit. It was present in all of the nine babies available for examination during the active stage of the disease. The same serological type was subsequently isolated from all of 22 cases of diarrhoea and vomiting examined during two outbreaks in a mothers and babies' hostel and one outbreak in a residential nursery. The results thus showed a constant association between *Bact. coli* D 433 and cases of undoubted infective origin.

Clinically, the characteristic feature of the cases in these outbreaks was diarrhoea and vomiting, leading to dehydration. Parenteral infection at the onset was limited to one case of bronchopneumonia. The strain was also isolated from 21 (91%) out of 23 sick babies who developed diarrhoea and vomiting during in-patient treatment in a children's hospital. In this group only two of the babies showed any evidence of parenteral infection at the start of their attacks. The circumstances in this series suggested that some, if not all, of these intercurrent cases were of an infective type.

Lower association rates between clinical cases and *Bact. coli* D 433 were found among the routine admissions to two gastro-enteritis units. These units accept cases from a wide area on the recommendation of medical practitioners, and therefore admit babies with diarrhoea and vomiting of possibly varying aetiology. In the first unit, six (43%) of the 14 cases yielded the strain. The clinical history of five of these six babies suggested that the attacks were of an infective type. In the second and larger unit *Bact. coli* D 433 was found in only five (21%) of a series of 24 babies admitted with diarrhoea and vomiting. The strain was not detected among the 14 babies examined in a large residential nursery. Their attacks of diarrhoea and vomiting were insidious in onset, and 11 of them were mild in type. The series of cases was spread over a period of two months and appeared to be due to a rise in incidence of the diarrhoea and vomiting endemic in this nursery rather than to an outbreak of the disease: it differed, therefore, in this respect from the sharp outbreaks which were investigated among other infant communities. Among a control series of 208 babies *Bact. coli* D 433 was not found.

The majority of the babies in whom *Bact. coli* D 433 was present had severe attacks of diarrhoea and vomiting. The relatively large number of severe cases associated with the strain may have been due, however, to the selection of this type of case for investigation. An unselected series of cases might have shown a different incidence of the strain in relation to severity. *Bact. coli* D 433 was in fact found in some mild examples of the disease such as those of the second outbreak in the mothers and babies' hostel.

The distribution of *Bact. coli* D 433 was not closely confined to one area or to one season of the year. The strain was found in counties as widely separated as Derbyshire and Sussex, and was isolated during all seasons from the winter of 1947 to the summer of 1948. It was not restricted to one age group among the cases, for the strain was present in babies ranging in age from 10 days to 11 months. It is interesting to note that *Bact. coli* D 433 was present both in young babies with epidemic diarrhoea of the newborn and in older babies with infective diarrhoea and vomiting.

Consideration was given to the possibility that *Bact. coli* D 433 may have owed its existence in the stools to some common factor in the feeding of those babies from whom it was isolated. An analysis of the feeds which were being given at the time of swabbing and during the previous few days showed, however, that the babies had received a variety of preparations and several types of added sugar. A small number were fully or partially breast-fed. Similarly, the administration of chemotherapeutic drugs could not be held responsible for the appearance of the strain, since 42 of the 63 sick babies from whom it was isolated had not received this form of treatment.

A diarrhoeal condition is evidently not essential for the existence of *Bact. coli* D 433; this was shown by the fact that the strain was isolated from a number of adult and baby contacts who remained free from intestinal disturbance. The possibility that the serological type may result from alimentary-tract conditions pertaining to all diarrhoeal states seems to be ruled out by the fact that it was not found in a number of babies with watery diarrhoea. More difficult to determine is whether the strain, present in small numbers and therefore passing undetected in the stools of the normal infant, may grow out freely under particular intestinal conditions associated with only certain forms of diarrhoea. Before reaching a decision on this matter a readier method than slide agglutination will be required for the detection of small numbers of *Bact. coli* D 433 on culture plates.

Relapses are a common occurrence during the course of diarrhoea and vomiting. Five babies were admitted to gastro-enteritis units with mild or moderate diarrhoea and vomiting. While under treatment they developed severe relapses with dehydration. *Bact. coli* D 433 was not isolated from them during their initial attacks, but it was found in all of them during their relapses. It seems possible that the relapses were in fact attacks of infective diarrhoea and vomiting acquired within the unit and superimposed on some milder primary condition.

In the later stages of the work a *Bact. coli* strain closely related antigenically to *Bact. coli* D 433 was isolated from babies in the maternity nurseries in which epidemic diarrhoea of the newborn had occurred more than one year before. It differed from *Bact. coli* D 433 in the possession of an H antigen and in producing no gas in "sugars." Some of the babies from whom it was isolated suffered from a mild and transient diarrhoea, but they were evidently free from diarrhoea of the severe epidemic type. Four aerogenic motile strains having the O and K antigens of *Bact. coli* D 433 were isolated from four older babies, two with

diarrhoea and vomiting and two healthy. The significance of these related strains of *Bact. coli* cannot as yet be assessed, but further work may bring an answer to this problem.

Another and more important problem is the possible status of *Bact. coli* D 433, when confirmed by biochemical and serological test, as a causative agent of infective diarrhoea and vomiting. Its close association with clinical cases in certain outbreaks of diarrhoea and vomiting and its absence from control groups of babies suggest that it may play some part in the genesis of the disease, but further work is necessary before any definite conclusion can be reached. Possible lines of research are animal transmission experiments, pathogenicity and toxicity tests, laboratory investigation of the strain for further distinguishing characteristics, closer correlation between the clinical findings and the detection of the strain, and studies of possible dual virus and *Bact. coli* causation.

Summary

A clinical and bacteriological investigation of infantile diarrhoea and vomiting was carried out. The clinical material was drawn from one outbreak of epidemic diarrhoea of the newborn (Group A), two outbreaks of diarrhoea and vomiting in a mothers and babies' hostel (Groups B and C), one outbreak in a residential nursery (Group D), intercurrent cases among sick babies in hospital (Group E), two series of admissions to gastro-enteritis units (Groups F and G), and endemic diarrhoea and vomiting in a residential nursery (Group H).

No recognized intestinal pathogen was isolated, and virus investigation of fatal cases yielded negative results.

Bact. coli sera, prepared from strains isolated from cases of Group A, led to the identification of a particular serological type, referred to as *Bact. coli* D 433. It was isolated from all nine cases examined during life in this outbreak.

The same sera were subsequently used for the identification of *Bact. coli* D 433 among the other groups of babies studied. It was isolated from all 22 cases (100%) of Groups B, C, and D, from 21 (91%) of the 23 cases in Group E, from 6 (43%) of the 14 cases in Group F, from only 5 (21%) of the 24 cases in Group G, and from none of the 14 cases in Group H.

Bact. coli D 433 was not isolated from any of the 208 babies of the control groups.

Five babies with mild or moderate diarrhoea and vomiting has severe relapses while in gastro-enteritis units. *Bact. coli* D 433 was not isolated from them during the initial attacks, but was present during the relapses.

Bact. coli D 433 was isolated from cases in seven counties and during all seasons of the year. The youngest baby in whom it was found was aged 10 days and the oldest 11 months.

Bact. coli D 433 was isolated from four of 84 adult contacts and from nine of 34 baby contacts examined in connexion with Groups A–E.

Bact. coli D 433 was not isolated from rectal swabs taken three to six months later from 82 infant occupants of nurseries and wards in which cases of diarrhoea and vomiting (Groups A-E) had been investigated. Fifty-one newborn babies, occupying the maternity nurseries in which epidemic diarrhoea of the newborn (Group A) had occurred, were swabbed more than a year after the outbreak. From 21 of them an anaerogenic motile *Bact. coli* strain was isolated which was closely related antigenically to *Bact. coli* D 433. Ten of these babies suffered from a mild diarrhoea the significance of which is at present undetermined.

Whether the serological type of *Bact. coli* has any aetiological significance in diarrhoea and vomiting is undecided. Lines for further research on this matter are indicated in the discussion.

We wish to acknowledge our thanks and indebtedness to the following: Dr. R. Cruickshank and Professor A. A. Moncrieff for their encouragement and advice; the Medical Committee of the Hospital for Sick Children, Great Ormond Street, London, for facilities for research in the wards and laboratories, and Dr. B. E. Schlesinger for his interest in the work; Dr. R. G. Cooke for facilities to make investigations in the Derby City Hospital; Dr. S. Dundon and Dr. R. E. Glennie for voluntary and invaluable service in the gastro-enteritis unit for neonatal diarrhoea; Mrs. W. S. Willett (working for the Public Health Laboratory Service) for the preparation of the *Bact. coli* sera and for much other bacteriological work during the early stages of the investigation; Dr. G. R. Osborn and Dr. M. Lécutier for permission to include their post-mortem findings; the medical officers of health of the areas in which investigations were made; the medical superintendents, medical officers, matrons, sisters, and nurses of the hospitals, nurseries, and welfare clinics concerned.

References

Allison, V. D. (1949). *Proc. R. Soc. Med.*, **42**, 216.
Bray, J. (1945). *J. Path. Bact.*, **57**, 239.
Buddingh, G. J., and Dodd, K. (1944). *J. Pediat.*, **25**, 105.
Chapman, G. H. (1945). *Amer. J. digest. Dis.*, **12**, 399.
Costello, J. P., and Lind, H. E. (1939). *Sth. med. J.*, **32**, 620.
Crowley, N., Downie, A. W., Fulton, F., and Wilson, G. S. (1941). *Lancet*, **2**, 590.
Gale, E. F. (1944). *British Medical Journal*, **1**, 631.
Giles, C., and Sangster, G. (1948). *J. Hyg., Camb.*, **46**, 1.
Gillespie, E. H. (1948). *J. clin. Path.*, **1**, 99.
Hynes, M. (1942). *J. Path. Bact.*, **54**, 193.
Kauffmann, F. (1947). *J. Immunol.*, **57**, 71.
Knipschildt, H. E. (1945). *Undersogelser over Coligruppens Serologi med saerligt Henblik paa Kapselformerne.* Nyt Nordisk Forlag, Arnold Busck, Copenhagen. (English summary.)
Light, J. S., and Hodes, H. L. (1943). *Amer. J. publ. Hlth*, **33**, 1451.
Lovell, R. (1937). *J. Path. Bact.*, **44**, 125.
Sakula, J. (1943). *Lancet*, **2**, 758.
Sevitt, S. (1945). *J. Hyg., Camb.*, **44**, 37.
Vahlne, G. (1945). *Serological Typing of the Colon Bacteria.* Gleerupska Univ.-Bokhandeln, Lund.

WHAT IS SOCIAL MEDICINE?*

BY

W. HOBSON, M.D., B.Sc., D.P.H.

Professor of Social and Industrial Medicine, Sheffield University

It is usually assumed that the expression "social medicine" is of relatively recent origin. Dr. René Sand (1948) has shown, however, that it was used exactly 100 years ago by Dr. Jules Guérin, writing in the *Gazette Médicale de Paris*. The idea of social medicine therefore is certainly not new. The only new thing about it is the reawakening of thought which realizes that here is something of fundamental importance that has been forgotten in certain circles.

If, in the past, clinicians have forgotten the importance of the environment in determining disease, hygienists have perhaps been too limited in their outlook and interpretation. Social medicine attempts to link together clinical medicine and preventive medicine in the hope of benefit to both. It is my purpose to try to illustrate the existence of a common ground between the two.

If we are to understand fully the meaning of and need for social medicine it is necessary to trace briefly the history of medicine as a whole and its relation to other branches of human activity.

To the Greeks medicine meant the art of healing; it achieved importance because of the necessity for curing a sick person of disease. The emphasis was therefore on the treatment of disease, and little or nothing was known of aetiology. Preventive medicine was certainly studied by Hippocrates, and his writings are full of sound reasoning concerning the spread of epidemics. Preventive medicine, however, could make no real advance until the basic sciences of physiology and bacteriology had been developed. Throughout the Middle Ages no advancement was made in

*A paper read to the West of England Branch of the Society of Medical Officers of Health at Bristol on Nov. 20, 1948.

our knowledge of aetiology, and treatment was largely empirical and often associated with magical and ritualistic rites. The Greeks also developed the idea of health not merely as absence of disease but as something to be cultivated.

The word hygiene, meaning "wholeness of body," is still in use to-day, and is associated with the idea of the production of a greater functional reserve against the encroachment of adverse influences by a discipline of clean and vigorous living. This theme of positive health is well illustrated by the words of William Morris: "First of all I claim good health; to feel mere life is a pleasure; to enjoy the moving of one's limbs and exercising one's bodily powers; to play as it were with sun and wind and rain; to rejoice in satisfying the due bodily appetites of the human animal without fear of degradation or sense of wrong-doing: yes, the wherewithal to be well formed, straight limbed, straightly knit, and expressive of countenance."

England was the first country in the world to control epidemic disease by the sanitary idea. Advancement in this idea did not of necessity depend upon the knowledge of causation of disease; indeed, the decreases in epidemic disease began before the germ theory of disease was established as a scientific doctrine.

Public Health

The Magna Charta of Public Health was passed in 1875, but for many years after that Sir James Creighton was disputing the germ theory of disease, and yet William Budd, working in this City of Bristol, had already shown the practical way in which excremental diseases were spread. Sanitary science is now a well-established technique, and as such it has its obvious social uses. It should not be taken for granted that it is any less necessary or less important than it was a century ago. It was perhaps unfortunate that the practice of public health was largely divorced from the practice of clinical medicine; indeed, it has been the fashion for the consulting physician to regard his brethren in the field of public health as belonging rather to another and inferior world.

The general practitioner, too, has tended to adopt a critically hostile attitude to the medical officer of health, and he has often resented an intrusion into the field of curative medicine. Certainly there has not always in the past been that happy liaison between the two which is to the best interests of the community. The public health services were saddled with the heavy responsibility of administering the municipal hospitals—a responsibility which was thrust upon them because the public health service was the only administrative machine in existence capable of dealing with it. It never was the function of a medical officer of health to enter this realm of curative medicine, and the recent steps taken to put these services under a separate authority are logical and necessary.

Side by side with the study of the environmental factors which affect health there was simultaneously a concentration of study on the disease processes in the sick individual. Diagnosis, which had formerly relied entirely upon the skill and experience of the physician at the bedside, became more and more dependent upon the intricacies of biochemical investigation, radiographic analysis, and the like, and the pathology of internal disease developed *pari passu* with the use of the microscope and the advancement in histological techniques. The era of internal medicine had arrived. Almost the whole of the resources of clinical medicine as practised in hospital were centred upon diagnosis and the removal of the disease process in the individual, and little attention was paid to the study of man in his environment.

This is the point of view which has permeated the teaching of medicine in many of our universities and medical schools. When he first qualified the medical student had received little or no training in the conduct of general practice. He soon learnt by bitter experience that to attach precise labels to disease was often difficult and impossible with his limited facilities. He discovered also that man is a social animal, and many of the disease processes he was called upon to control had roots in social sources, in particular that of poverty and all that is associated with it—bad housing, overcrowding, unemployment, and inadequate food.

Adverse Social Factors

To-day we realize that disease processes can be initiated not only by adverse factors in the purely physical environment but also by adverse factors in the social environment. With the growth of civilization and urbanization the technicalities of life have become more and more complicated and increasingly difficult to understand. The factors which make for a healthy social environment are becoming more difficult to obtain. A happy family circle, a full and adjusted community life at work and at play, a sense of purpose and responsibility in the world—these are of vital importance to social well-being. In the troubled times in which we live it is small wonder that the psychosomatic diseases such as duodenal ulcer and angina pectoris have increased in prevalence; and there are other pointers to psychosomatic imbalance, such as the increased urge for tobacco and the rise in juvenile delinquency.

It is also important to realize that diseases conditioned by an adverse environment have often inevitable social implications and repercussions in themselves. Tuberculosis, venereal disease, and many mental ills are typical and outstanding examples of those conditions in which the individual has in turn a responsibility to the community.

The family physician has always been aware of these various factors in the physical and social environment which affect the health of his patients, and he is equally aware that these factors are of profound importance in determining health or disease. Unfortunately, as an individual he is not always in a position to correct them, as the causes are often dependent upon the social framework and way of life of the community. There are, nevertheless, many factors in the environment which it is in our power to control, particularly by communal action. They come into the realm not only of preventive medicine but also that of curative medicine.

When we consider the effect of environmental factors upon health we find there is no hard-and-fast line between prevention and cure. The use of the term "preventive medicine" in this sense is therefore limited in its scope; the term "corrective" is perhaps more suitable. In America, according to Smillie, the term "preventive medicine" has an even more limited application. It is used to describe those activities in the prevention of disease which are the direct responsibility of the individual, and "public health" serves to denote those factors which are a responsibility of the community. However we define these terms it is clear that the physician in practice has an obligation to his patient and to the community to prevent illness and to promote family and communal health, and for that reason full diagnosis and adequate treatment are impossible without a knowledge of the social and economic factors which influence the life of the patient.

"Internal" and "External" Medicine

One thing is clear: the term "medicine" as used in its widest sense to-day is no longer limited to the art of healing. It includes the prevention and treatment of disease, and takes within its compass the study of the basic sciences of anatomy, physiology, and pathology as well as the healing arts of clinical medicine and surgery. It also includes within its scope the factors which promote health. There is no sharp dividing-line between health and disease—the one merges imperceptibly into the other; and I must stress the point that there can never be watertight compartments in medicine. There is a need for stressing the importance of environment in medicine, because in the teaching schools and in hospital practice this has often been forgotten. We can call this "external medicine."

In what way does "internal medicine" differ from external medicine? Internal medicine has for its background the study of the internal anatomy and physiology of the individual and the elucidation of the changes which take place in disease and their internal causes. It is concerned with the diagnosis of the disease condition and with the treatment of disease by the correction of the deranged mechanisms of the body, whenever possible. External medicine, on the other hand, has for its background the study of social structure and social pathology; it is concerned with the ultimate aetiology of disease and with those factors which promote health. It aims at the control of these factors both by individual and by communal action.

So far as research and investigation are concerned we can see two lines of development. The high-power research of the laboratory has centred largely upon internal medicine, mainly because the immediate results have been of practical value to the patient. But original research and investigation in external medicine, apart from epidemiology, have been haphazard and have lacked organization and co-ordination. With a few exceptions, what has been done has usually been carried out by individuals working alone in the course of busy routine work. But research in external medicine more than in any other branch requires team-work, organization, the use of statistical method, and survey technique. In the past undoubtedly valuable contributions have been made by medical officers of health; but as their time became more and more absorbed with routine work so their opportunities became less.

The result is that our knowledge of disease processes in the body and our advances in diagnostic technique have outgrown our knowledge of aetiology.

The practitioner of medicine must be a complete doctor; he must study and consider all factors affecting health, internal and external. Sir William Osler, one of our greatest clinicians and a prolific writer on internal medicine, was also a great exponent of the value of external medicine.

Definition of Social Medicine

With these ideas in our minds we are now in a position to give a definition of social medicine and to demonstrate its activities.

Social medicine is the study of those environmental factors which affect health, and the application of that study to the benefit of man. It has two main applications: (1) The use of this knowledge for the benefit of the individual both in health and in disease: this is a responsibility not only of the physician and surgeon but of each individual. (2) The use of this knowledge on a community basis: this is a responsibility of the community and has been known in the past as "public health" or "State medicine."

The term "environment" is used here in its very widest sense, to include not only the physical and social environment but also the study of heredity and genetics in their effect upon human health; and by the term "health" is implied "optimum health," and not just the absence of disease. Clearly we cannot be limited in our conception of the communal aspects of this branch of medicine.

From what has been said it is not possible to separate preventive from curative and individual from communal medicine. It may be asked why it has been necessary to reintroduce the term "social medicine" at all. I think the answer lies in the fact that the older terms "public health" and "preventive medicine" are too limited in their scope to define adequately the branch of medicine which I have described and which has definite claims to be regarded as a distinct branch. It also indicates the importance of the social environment as distinct from the purely physical environment. Unless we take into account all factors affecting health, our efforts to improve social evils may cause more harm than good. Thus Dr. Mannheim (1948) has shown that in Cambridge there is a much higher rate of juvenile delinquency on the new housing estates, just as Dr. M'Gonigle at Stockton-on-Tees found a higher death rate in a population which had been moved from a slum area to a new housing estate. Rehousing in itself is no cure for social evils.

Clearly there are many factors not mentioned in the Public Health Acts which affect health, and it is difficult to envisage any field of human activity or endeavour that does not have its repercussions upon the health of the individual—agriculture, the Road Traffic Acts, the employment of labour, town planning, crime, finance, sport, and even politics. It is this common interest which brings social medicine in relation to so many phases of human activity.

Mortality Statistics

One of the basic sciences of social medicine is that of social pathology, just as the basic science of clinical medicine is human pathology. Its function is to study the disorders and ills dependent upon a communal life. The idea, however, is certainly not new. One of the greatest accounts of social pathology was that written by Edwin Chadwick (1842). This was, however, largely concerned with the physical environment. Much of the information on the adverse effects of environment can be ascertained from the study of mortality statistics, first instituted by John Graunt and later developed by William Farr. Our information on communal mortality is contained in the Registrar-General's Reports. Perhaps the most important of all these is the Decennial Supplement on Occupational Mortality for 1931. Although this document was not published until 1938 it constitutes the most complete account in any country of mortality analysed by occupation and social class. The technique of the analysis of mortality statistics has been described by John Ryle (1948) as the "social post-mortem."

It is easy to arrive at erroneous conclusions from a study of mortality statistics. The Registrar-General has made every endeavour to eliminate these from the purely statistical point of view. He is able, for example, to measure the effect of an ageing population and to counteract this effect by the use of special devices: this is particularly important in such diseases as cancer and heart disease. He is not, however, able to measure changes in the fashions and trends of diagnosis. We know that there have been considerable changes and inaccuracies in diagnosis in recording the cause of deaths. This may make considerable differences in such diseases as bronchogenic carcinoma and

the leukaemias. An interesting example is seen in the changing trend of diagnosis between nephritis and essential hypertension, which has recently been analysed in cotton-workers by Platt.

The value of mortality statistics lies not so much in their relative accuracy as in the fact that they are pointers to lines of more detailed study and research, lines of study which should give vitally important information on the causation of disease. It is clear that for their correct interpretation one must have some knowledge of disease processes in the body. There is no doubt that here is common ground for social pathology and internal pathology, and the one can make good the deficiencies of the other.

The morbid anatomist is too often apt to regard his material as characteristic of the population as a whole. Usually, however, his material is highly selective and is based on a very small sample of the population. On the other hand, the information which is gleaned by the social pathologist very often includes the whole population. The wise pathologist will not limit his activities to the field of morbid anatomy. He will combine the studies of experimental and social pathology and endeavour to correlate the findings of these techniques. But the use of such methods is still in its infancy; that is why I look to the future to see the increasing use of morbidity and mortality statistics as research tools of the social pathologist.

Infant Mortality

If we attempt to analyse mortality we find that it is greatest at the extremes of life. In infancy and old age the individual is less adapted to withstand adverse environmental factors. The infant mortality rate has often been used as an index of the healthiness of a community, and there is a considerable differential class mortality, the mortality rate being considerably higher in the lower social groups. This information has been analysed in detail by Titmuss, who has shown that this differential class mortality, contrary to what is usually assumed, is, if anything, becoming more pronounced. I would draw attention to the fact, however, that mortality in the second year of life is probably a more sensitive index of environmental factors. Thus the mortality rate from measles during the second year of life is 19 times greater in the lowest social class than in the highest.

I would here like to draw attention to an interesting feature of infant mortality in relation to the occupation of the father. When we consider those occupations which are connected with the highest infant mortality, are we right in assuming that the social way of life entailed by those particular occupations is responsible for the high loss of infant life, or are there genetic influences at work? Also, are there sufficient numbers from which to draw any significant conclusion?

As one would expect, there is a very high mortality amongst the infants of labourers, costermongers, and similar groups. Three occupations, however, show a high infant mortality where one would not expect it to occur. These occupations are sugar-confectionery makers, retailers of sugar confectionery, and salesmen of sugar confectionery. I shall leave you to decide whether there is any real significance in the association of a high infant mortality with employment in the sugar confectionery trade.

There are, of course, not only diseases of poverty; there are also diseases of affluence. Thus gout, diabetes, and particularly cirrhosis of the liver show a greater mortality in the higher social classes, and in publicans in particular. It is interesting to note that a considerable fall in mortality in these diseases occurred during the war, a fall which was not shared by our neighbours in America. And what of the diseases of worry, the so-called psychosomatic affections, of which duodenal ulcer and angina are important examples? Surely there is some significance in the observation that the mortality has increased during the last few years and that it is greatest in the higher social classes?

I shall not attempt to discuss all the possibilities envisaged by these observations, but hope that they will stimulate others to search this fascinating publication, the Decennial Supplement on Occupational Mortality, for further information, and perhaps even to pursue their own inquiries into the aetiological relationships suggested by this technique of the "social post-mortem." Personally, whenever I pick up some occupational mortality supplement I never fail to find something new and exciting.

Duties of Medical Officer of Health

In 1925 the Ministry of Health issued a memorandum on the duties of the medical officer of health, and in it appears this sentence: "He should endeavour to acquire an accurate knowledge of the influences, social, environmental, and industrial, which may operate prejudicially to health in the area."

So far as the study of the occupational influence is concerned it remains virtually an unexplored field to the medical officer of health. He has therefore a great part to play in the development of this idea, and a fresh sphere of opportunity awaits him. The loss of the millstone of hospital administration can only be to his ultimate advantage, for in that way he is left free to investigate the environmental factors which affect health. The opportunities will present themselves, but to make full use of them he must go to the homes of the people and become more closely associated with the activities of clinical medicine. The formation of practitioner health centres should provide a great opportunity for him in this respect. The only way to obtain the final answer on the aetiology of many disease conditions is to study man in his environment. This is no new idea; it was expressed by Ramazzini in 1705 in words which might be applicable to-day: "For my own share I have done what I was able to do and thought it no indecency to step sometimes into the meaner sort of houses, especially now that almost all physic is reduced to mechanism and the schools sound of nothing so much as an automaton or machine of the body, the shops and houses of tradesmen are the only schools in which we can find any satisfactory knowledge of these matters."

Two important and stimulating addresses on the importance of this idea have recently been given—the first by Professor Parry (1948) in his Presidential Address to the Society of Medical Officers of Health, and the second in a broadcast in the Third Programme by Dr. Cohen (1948); perhaps Professor Parry will forgive me if I make a comparison between the two. Professor Parry has indicated how important it is that the medical officer of health of the future should become more clinically minded and have opportunities for visiting the homes of the people. Dr. Cohen, on the other hand, has shown how meagre is our information on the social sciences, how little we really know of the way people live, and the need for a science of society. There is a woeful lack of data on which to base a scientific approach to the planning of health services and an absence of any kind of research organization in public health departments.

One would have thought that such organizations were essential before we could even begin to find the answers

to some of our practical problems. I hope that in the future the Minister of Health will make some constructive proposals enabling public health departments to set up machinery for sociological investigation, for this is urgently needed to answer some of our immediate practical problems, quite apart from the more fundamental research into aetiology, which must be carried on by university departments of social medicine. Nor must we be cheese-paring in our demands: this type of research requires teams whose sole function is research and whose time is not burdened with routine duties.

Statistical Method

It is clear that false conclusions and deductions can arise from the observations of one man alone, and it was not until the statistical method was applied to the measurements of morbidity and mortality that any real advance was made. Unfortunately, similar mistakes are perpetrated to-day, and medical men in particular are very prone to generalize from results of their own often limited experience. That is why I regard the use of the statistical method of the utmost importance in the study of social medicine.

In the words of Greenwood: "The knowledge which a great physician has of the body and of the mind is neither meagre nor unsatisfactory, but physicians great or small cannot assess group experience without resort to a calculus of groups which must be statistical." One has only to glance through the sections on aetiology in some of the earlier textbooks of medicine to realize the importance of this statement. There are mistakes the origin of which can be traced back to the limited observations of one man. Such mistakes are copied from textbook to textbook, and once they have appeared in print they are more than difficult to eradicate, and even to-day some are still retained. The recorded observations on normal ranges of physiological variations in groups of human beings are also in a very chaotic state, and, apart from Price-Jones's research into the size of the red cell, there has been very little real work done on a statistical conception of normality. The Grant study at Harvard is an attempt to remedy this. When we look for an organized science of aetiological relationships we can see that it is heavy with hypothesis and dismal with uncorrelated observations. Practical success in the prevention of disease depends upon advances in our understanding of causation. As Seiglitz has pointed out, there are predisposing, provoking, and perpetuating factors in disease, all of which come under the heading pathogenesis, and there is rarely one single aetiological factor. I am certain that it is fundamentally wrong to think of a single cause in aetiology. Tuberculosis provides a very good case in point. It may be caused by the tubercle bacillus, but, in terms of practical politics, genetic, nutritional, and environmental factors are of considerable importance in determining the onset of disease. How else can we explain the fact that some individuals can remain perfectly healthy despite heavy and repeated exposure to the tubercle bacillus and yet others require only a minimal exposure to produce a widespread and extensive disease process? Very often the predisposing and perpetuating factors are of greater importance than the provoking factors.

Of all diseases which require detailed investigation none is more important than tuberculosis. Here is a disease of which we know the predisposing, provoking, and perpetuating factors in its causation, and yet it remains the most important cause of death in young people. In females in this country aged 15–20 it still accounts for 40% of deaths. There can be no more important study than the social medicine of tuberculosis.

So far I have confined myself to a study of mortality; that does not mean that the causes of ill-health are not important. In the words of Dickens: "It concerns a man more to know the risk of the fifty illnesses that may throw him on his back than the possible date of the one death that must come." It is over fifty years since Sir John Simon recognized the importance of information on morbidity statistics and advocated their use. We still have no organized means of obtaining such information.

Important Aspects

This conception of social medicine would not be complete if it did not indicate in some degree the emphasis to be placed on its various aspects. There are those who would place this emphasis on its application to the benefit of the patient in hospital, others on health and its communal aspects. John Ryle, himself a clinician of considerable experience and the first professor of social medicine in this country, has elaborated the importance of social medicine in its clinical application. He has nevertheless indicated that the aspects associated with the community and its relation to health are possibly of even greater importance. It is clear that our conception of social medicine must include within its scope the realm of preventive medicine, public health, occupational medicine, and the application of those humanitarian principles so long practised by the good family physician.

There is no doubt that the occupational environment is of supreme importance, but it seems to me that the relative importance of industrial toxicology in the causation of ill-health and death has been grossly exaggerated. It is fascinating and exciting to read about beryllium lung and manganese pneumonitis, but disease arising from such specific poisons is extremely rare compared with the common diseases from which men suffer and die. Many occupations show a high mortality rate because of the social way of life necessitated by those occupations. This is proved by the fact that in a great many occupations the high mortality rate of the men is shared by the wives who are subject to the hazards of the same social environment but do not share the specific occupational hazards. There are of course occupations which have high mortality because they attract men of poor physique—for example, tailoring, printing, and the boot and shoe industry.

Conclusion

In a free society our aims must be to provide a healthy environment and to ensure that all possible measures are taken to secure freedom from disease. Each individual must be left free to develop according to his own needs and requirements. The idea that there should be any dragooning into health savours to me of the Nazi doctrine: hard physical exercise is not the only way to achieve optimum health. That is why I am always a little suspicious of those individuals who talk about positive health.

I regard social medicine as a philosophy which should permeate all branches of medicine, for its implications cannot be divorced from any branch of medical learning. It is a branch of medicine also which provides a connecting-link with the wider humanities. In the teaching of medicine the accumulation of facts has been pursued, to the neglect of the study of man in his environment. The liberal and intellectual structure of medicine and the humanism of medicine are often lost in a welter of technical detail. It is well to remember that the great pioneers of social medicine were men of liberal education and wide outside interests. They were interested in men as part of humanity.

If I were asked to define social medicine concisely I should answer: "The study of man within his environment, to give him life and to give it more abundantly."

REFERENCES

Chadwick, E. (1842). *Report on an Enquiry into the Sanitary Condition of the Labouring Population of Great Britain.* London.
Cohen, J. (1948). *Listener*, **40**, 485.
Mannheim, H. (1948). *Juvenile Delinquency in an English Middletown.* London.
Parry, R. H. (1948). *Pub. Hlth*, **62**, 27.
Ramazzini, B. (1705). *A Treatise on the Diseases of Tradesmen* (translated from the Latin). Bell, London.
Ryle, J. A. (1948). *Changing Disciplines.* London.
Sand, R. (1948). *Vers la Médecine Sociale.* Desoer, Liége.
Simon, J. (1890). *English Sanitary Institutions.* London.

THE AGE OF THE MENARCHE

BY

DAGMAR C. WILSON, M.D., M.R.C.P., F.R.C.O.G. D.P.H.

AND

IAN SUTHERLAND, M.A., D.Phil.

(From the Institute of Social Medicine, Oxford)

During the past century there has been a general tendency for European children and adolescents to grow with increasing rapidity, so that at a given age they are now taller and heavier than children of 50 years ago. This effect is also found in the more privileged classes compared with the less privileged, and has been ascribed to better nutrition (Morant, 1939). Studies of London school-children reflect a similar secular change in growth (Daley, 1948). The possibility that earlier sexual maturity may be associated with this accelerated growth in stature and weight is a matter of some social importance and has led to the present inquiry.

It is generally accepted that the development of sexual maturity is influenced both by heredity and environment and, more directly, by the action of pituitary hormones on the thyroid gland and gonads. H. Hogben, J. A. H. Waterhouse, and L. Hogben (1948), in a noteworthy contribution to the study of puberty, have discussed the salient features concerned in the process of full development. Ellis (1948) has shown that when comparing growth and nutrition in groups of boys and girls the stage of sexual maturity of the individuals concerned is almost as important as their chronological age; he has suggested a simple clinical grading for the use of school medical officers.

The onset of menstruation, now usually referred to as the menarche, represents to the individual girl a very definite point in time, which can be accurately determined retrospectively within a few years of its occurrence. No other aspect of sexual maturation, whether in girls or in boys, is so striking. Thus, although the onset of menstrual periods is only one aspect of a complex developmental process, information regarding it can be obtained quickly and reliably. For these reasons the present study is confined to sexual maturation as exemplified by the age of the menarche.

Observations in many different countries show that groups differ in the average age of the menarche. A number of associations between the age of onset of menstruation and environmental influences have been stressed by several investigators. (1) It has been stated that town girls on an average menstruate earlier than country girls. (2) Associations with height and weight have been demonstrated. (3) It has been asserted that girls nowadays are menstruating on an average at an earlier age than did their mothers (Kennedy, 1933; Pryor, 1936; Michelson, 1944). The present investigation was planned to consider afresh these three suggestions.

Data

Data were collected from nine secondary girls' schools, of which three are in Oxford City and the other six in Oxfordshire. The schools draw children from a variety of social and economic environments. The information included the present ages, heights, and weights of the children, together with a record of whether their menstrual periods had started, and, if so, of their age at the time of onset. In order to be sure that the samples were representative of the geographical areas served by the schools, children were included only if they had been resident in the area for at least three years preceding the menarche or the date of the inquiry, whichever occurred earlier. At one city school the information was available only for those whose periods had already started. In all, records were analysed for 1,338 girls between the ages of 10 and 19—572 were from city schools and 766 from country schools. Of the total, 604 had not started menstruating when the inquiry was made.

City and Country Schools

The age of onset of menstruation ranged in individual girls from 9 to 18 years. The average age of the menarche among the children who had attained it was 13.23 years. In the three city schools the figure was 13.4 years and in the six country schools 13.09 years. However, in each school a substantial proportion of the girls had not started menstruating, and this fact makes the average ages quoted above dependent upon the age distribution of the children in the various schools. Schools with a higher proportion of older girls will naturally return a higher mean age at the menarche among those whose periods have started. This effect is shown in Table I.

TABLE I.—*Age of the Menarche in City and Country Schools*

	Average Age of Menarche	Average Age of All Children
City schools	13·40 years	14·03* years
Country schools	13·09 „	13·70 „
All schools	13·23 „	13·83 „

* Two schools only.

It is evident that the apparently lower age of the menarche in country schools may express no more than the younger average age of the children at those schools. The point was tested explicitly in the following manner. It is possible from the data to calculate for each birth anniversary the percentage of girls who have started menstruating by that age. The information for *every* girl who has passed the particular birth anniversary, whatever her present age, may be used to contribute to the calculation of this percentage. Table II shows

TABLE II.—*Percentages of Children who have Attained the Menarche by Various Ages in City and Country Schools*

Age	2 City Schools	6 Country Schools
9	0·0	0·0
10	0·2	0·0
11	0·6	1·0
12	5·6	7·5
13	24·8	29·6
14	64·6	63·3
15	90·8	89·4
16	95·5	95·4
17	100·0	98·2
18	100·0	100·0

such percentages for city and country children. The "median" age of the menarche—that age at which half the girls have started their periods—when estimated graphically is almost identical at about 13.6 years in the two groups. Nor is there

TABLE III.—*Numbers, Mean Present Heights (in.) and Weights (lb.) of Children according to Present Age and Age of the Menarche*

TABLE III.—*Numbers, Mean Present Heights (in.) and Weights (lb.) of Children according to Present Age and Age of the Menarche*

Age of the Menarche (Years)	Present Age (Years)	10–11			11–12			12–13			13–14			14–15			15–16			16–17			17–18			18 +			All Ages		
		No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.	No.	Ht.	Wt.
			in.	lb.		in.	lb.		in.	lb.		in.	lb.		in.	lb.		in.	lb.		in.	lb.		in.	lb.		in.	lb.		in.	lb.
9–10					3	61·2	113·8	5	62·5	144·5	1	62·5	126·5	3	63·2	126·5	1	64·5	140·5									1	64·5	140·5
10–11					6	61·0	106·7	11	62·9	123·6	13	63·4	115·9	16	63·6	123·7	14	—	137·2									12	62·3	130·8
11–12								34	62·2	105·8	67	63·2	119·2	53	63·7	123·4	36	64·0	119·7	9	64·2	132·6						71	63·6	123·3
12–13											58	62·7	117·3	97	63·6	115·7	75	64·7	125·6	14	64·3	127·0						212	63·4	119·0
13–14														43	63·7	110·0	45	64·6	116·6	32	64·7	127·3	1	64·5	132·5			275	63·9	121·0
14–15																	9	63·2	109·4	31	64·5	122·0	13	64·4	129·3			132	64·3	116·0
15–16																				10	63·4	112·9	10	64·4	135·7	3	64·2	116·5	27	63·8	114·8
16–17																				1	63·5	108·5	6	64·8	120·9	2	65·5	133·5	3	66·2	130·8
17+																							2	67·5	142·0				1	61·5	108·5
All who have menstruated		—	—	—	9	61·1	109·1	50	62·3	113·6	139	63·0	118·2	212	63·6	117·2	180	64·5	122·3	97	64·5	123·5	39	64·7	128·0	8	64·3	120·3	734	63·8	119·7
All who have not menstruated		4	57·5	83·7	158	58·0	84·3	220	59·4	87·2	151	60·9	93·0	53	62·2	100·9	18	63·1	104·6	—	—	—	—	—	—	—	—	—	604	59·8	89·6
Difference of last 2 rows						3·1	24·8		2·9	26·4		2·1	25·2		1·4	16·3		1·4	17·7											
Standard error of difference						0·9	4·8		0·4	3·2		0·3	1·8		0·5	2·5		0·5	2·1											

Metric equivalents: 1 inch = 2·54 cm.; 1 lb. = 454 g.

any suggestion of a greater spread in the age of the menarche among one group of children than among the other. There is thus no apparent difference between the children from town and country in respect of age at the menarche.

Height and Weight

Table III gives the mean heights and weights of all the children studied according to their present age and their age at the menarche. The data for those children whose periods had not started are analysed according to their present age.

The most striking feature of the table is the considerably greater mean heights and weights among those who have menstruated compared with those of the same age who have not. Where weights alone are concerned the frequent plumpness of girls at this phase of life has long been a familiar observation. For children of 11 or 12 the difference in average height is about 3 in. (7.5 cm.) and in weight about 25 lb. (11.3 kg.). For children of 14 or 15 the difference in mean height is about 1½ in. (3.75 cm.) and in weight about 17 lb. (7.7 kg.).

The columns of the table give some indication of the way in which present height and weight depend upon the interval since the menstrual periods started. There seems to be little or no variation in present height according to the interval since the menarche. There is a slight tendency among the younger girls for those who first menstruated recently to have lower weights than girls of the same age who first menstruated earlier. It is quite evident, however, from the figures that growth is much slower after the menarche, and that there must be a considerable spurt in growth shortly before or around the time of onset of the menstrual periods.

Mothers and Daughters

At one of the city schools it was possible to arrange an approach to the mothers of the girls who had already menstruated, and to obtain, in confidence, information regarding the age of the mother at her menarche. The mothers of 54 girls were involved. The mothers of two were dead, and it was not possible to get in touch with the mothers of three others. A brief explanatory questionary was posted by the school medical officer to the mothers of the remaining 49 girls and replies were received from the mothers of 41. Mother and daughter were given a common code number by the school authorities and so in each instance the difference between the ages at menarche could be determined. In this way genetic differences were allowed for to some extent.

Table IV shows the distribution of the differences in ages at the menarche. In 16 instances the daughter was older than the mother; in 16 instances the mother was older than the daughter; and in nine instances the ages at the previous birthday were identical. There is no evidence from this admittedly small sample of any decrease in average age at the menarche.

TABLE IV.—*Age of Mother at the Menarche Minus Age of Daughter at the Menarche for 41 Daughters (39 Mothers)*

Difference Between Ages at Birthday Previous to the Menarche (Mother minus Daughter)	No. of Instances	
−4 years	1	
−3 „	1	16
−2 „	7	
−1 year	7	
0	9	
1 „	8	
2 years	6	16
3 „	2	

Discussion

The negative findings in the first and third parts of this inquiry are not necessarily inconsistent with earlier findings. The association between height and weight and the age of the menarche, which appears so clearly from the figures presented here, suggests that nutrition may be an important factor in sexual development, and the adequacy of nutrition could well differ as between town and country or between one generation and the next. In this instance it is doubtful

if considerable differences in nutrition do occur between the children in the various schools, where milk and meals are provided, or in their homes, where the dietary is both uniform and adequate as a result of equitable rationing during the past nine years. The mothers who were approached regarding their own age at the menarche were drawn from favoured social groups, and it is unlikely that the mothers' nutrition differed greatly from that of their daughters. It is unfortunate that the planning of a similar inquiry among mothers in poorer homes would probably be hampered by prejudices associated with the subject.

The figures in Table III confirm the conclusion of Ellis (1948) that the stage of sexual maturity is as important in assessing growth as is chronological age. It is noteworthy that no entry relating to the age of the menarche is at present included in the new school medical record card of the Ministry of Education. If the physical growth of girls is to be adequately assessed this omission will need to be remedied.

Shuttleworth (1937) presents individual growth curves of 10 girls who first menstruated between 10 years 7 months and 11 years 3 months, and of 10 girls with menarche between 14 years 5 months and 15 years 2 months. The first group were on the average taller during the period from 8½ to 12 years of age than those in whom the menarche occurred later. There was a rapid decrease in rate of growth in stature after the menarche. Those whose menarche was later continued to grow after the girls in the earlier group had practically ceased and in the end were taller. Our findings do not confirm this last observation. Table V summarizes the figures of Table III for the 47 girls aged 17 and 18. There is no consistent tendency for those whose menarche was later to be either taller or heavier than those who first menstruated earlier.

TABLE V.—*Mean Heights and Weights of Girls aged 17 and 18 According to Age of the Menarche*

Age of the Menarche	No. of Girls	Mean Height	Mean Weight
Under 13 years ..	10	64·4 in.	125·4 lb.
13–14 ,, ..	13	64·6 in.	135·7 lb.
14–15 ,, ..	13	64·3 in.	119·9 lb.
15 years and over ..	11	65·1 in.	125·4 lb.
All ages	47	64·6 in.	126·8 lb.

Conclusions

Data concerning the age of the menarche were obtained from 1,338 girls (604 of whom had not yet started their periods), between the ages of 10 and 19, attending three secondary schools in Oxford City and six in Oxfordshire. These schools cater for children from a variety of social and economic environments.

1. No differences in the age of onset of menstrual periods could be detected between children attending the town and country schools. The median age (that at which half of the girls had started menstruating) was 13.6 years. The age ranged in individuals from 9 to 18 years.

2. Girls who have not started menstruating are considerably shorter and lighter than their fellows of the same age whose periods have started. On the other hand, there is little difference in the mean heights and weights of the latter groups when subdivided according to the interval since the menarche. It is concluded that there must be a considerable spurt in growth before or around the age of menarche.

3. The close relation with height and weight means that information on the age of menarche is essential for the adequate assessment of physical growth in adolescent girls. As yet no provision is made for this information on the Ministry of Education's new school medical record card. This omission should clearly be made good.

4. A small number of mothers of a more favoured social group were compared with their children in respect of the age of menarche. There was no apparent tendency for the children to start menstruating at an earlier age.

5. It is suggested that the negative findings (1) and (4), which fail to confirm the work of earlier investigators, may arise from the comparable nutritional status before or during adolescence, in this country, of the groups involved.

6. There is no evidence that the height and weight of girls aged 17 and 18 is in any way related to the age at which they first menstruated.

We are indebted to the educational and medical authorities and the teaching staffs of nine schools in the City and County of Oxford, to Dr. Isabelle Little in particular, and to the mothers of the girls for their help in obtaining the necessary data.

REFERENCES

Daley, A. (1948). *Med. Offr.*, **79**, 242.
Ellis, R. W. B. (1948). *Arch. Dis. Childh.*, **23**, 17.
Hogben, H., Waterhouse, J. A. H., and Hogben, L. (1948). *Brit. J. soc. Med.*, **2**, 29.
Kennedy, W. (1933). *J. Obstet Gynaec. Brit. Emp.*, **40**, 792.
Michelson, N. (1944). *Amer. J. phys. Anthrop.*, **2**, 151.
Morant, G. M. (1939). *The Races of Central Europe.* London.
Pryor, H. B. (1936). *J. Pediat.*, **8**, 52.
Shuttleworth, F. K. (1937). Monograph of the Society for Research in Child Development, **2**, No. 5, National Research Council, Washington.

OBSERVATIONS ON THE TREATMENT OF INFANTILE GASTRO-ENTERITIS

BY

C. ZAHRA NEUMANN, M.D., D.C.H., M.R.C.P.

(*From the Royal Malta University*)

The aetiology of infantile gastro-enteritis is still far from clearly understood. In a proportion of cases met with in Malta, especially in our hot summers, the disease is almost certainly of infective origin, but the nature of the causative organisms is a matter of acute controversy, as it has been impossible to incriminate any specific agent except in some cases belonging to the dysenteric, enteric, and salmonella group of diseases. Bacteriological examination of the stools of healthy and sick babies has disclosed no qualitative differences; indeed, some paediatricians have held that gastro-enteritis was not provoked by any specific organism but that it originated from the invasion of territory normally sterile, such as the upper reaches of the small intestine (Moro, 1916; Blacklock *et al.*, 1937). Others have postulated a virus infection and offer as evidence the observation that epidemics of gastro-enteritis and of colds seem often to occur together (Gunn, 1944). From the study of some 400 cases Sevitt (1945) concludes that paracolon and proteus bacilli are responsible for many cases of infantile gastro-enteritis. The disease may not represent a single entity, but may be the resultant of a number of different agents.

An Explanation of the Mechanism of Enteritis

If the rapid and abundant loss of fluid which is the cardinal sign of gastro-enteritis originates from the intestinal vascular plexus it must imply quite an abnormal permeability of the capillaries. Although many factors may contribute to produce this exaggerated leakage, it is probable that histamine ranks high on the list.

Histamine is a disintegration product of the amino-acid histidine, and the conversion can be effected by a variety of organisms acting on proteins; appreciable quantities of histamine are found in the stools of mammals. Experimentally, if administered in suitable amounts it is able to induce vomiting and diarrhoea, often with strong colicky pains. The effect is transitory owing to a rapid destruction of histamine by various agents, among which is the ferment histaminase, and perhaps also by a compensatory discharge of adrenaline (Feldberg, 1941).

Analysis of Some Methods of Treatment

If one bears in mind how many different methods of treatment have been proposed for enteritis, most of which are successful in at least some cases, one can reason that it is by no means essential to kill any pathogenic organisms in order to cure the disease.

Castor oil will often clear a mild diarrhoea in a matter of hours, and it can do so only by the rapid excretion of the irritating agents; its antiseptic powers are of course negligible. If we are prepared to admit that histamine is the principal cause of the diarrhoea, then its quick removal lowers its concentration around the intestinal vascular plexus, thus diminishing the permeability of the blood vessels. The natural resistance of the body can then cope with the organisms remaining in the gut.

Heisler (1928) and Moro (1929, 1930) recommended apples for enteritis. This treatment was widely conceded to be effective in mild cases, and various modifications, such as the use of bananas and carrots, were proposed by Continental paediatricians (Feer, 1929; Fanconi, 1930; and Glanzmann, 1939). The mode of action is supposed to be due to the adsorption of toxic and irritating agents by pectin (Salomon, 1936). Ramos (1941) published a study on the carob (*Ceratonia siliqua*), a tree of the Leguminosae family which is abundant in most Mediterranean countries. The pod, whose epicarp is almost as hard as wood, contains a sweet pulp much prized as fodder for horses. Ramos claims that roasted and pulverized carob pulp is very effective in gastro-enteritis.

While apples are rich in pectin (5.7 g. per kg. of apple pulp), a kilogram of a 10% carob suspension contains only 1.8 g. of this carbohydrate: hence the active material in the carob pulp cannot be pectin. Martin du Pan (1945a), who states that carob pulp is very rich in lignin, ascribes its therapeutic action to this. Freudenberg (1939) has written an interesting paper on this hydrophilous colloid, while Martin du Pan (1945b) states that one litre of a 5% carob suspension is able to adsorb 0.74 g. of histamine, whereas a 5% suspension of "aplona" (an apple product) is able to adsorb little more than half this quantity. On adsorption the amino-acids are not susceptible to the action of bacterial enzymes, and thus the formation of histamine and other irritants is much diminished.

The First Antihistaminic

In 1930 Best and McHenry reported that watery extracts of various organs were able to inactivate histamine through the action of a body to which they gave the name of histaminase. Rose and Browne (1938) thought that, although histaminase was not the only agent capable of destroying histamine, they had found that the mucosa of the small intestine contained large quantities of histaminase; it was therefore possible that in the absence of sufficient quantities of this enzyme histamine would display its usual toxic effects. Histaminase is believed to act on histamine by first separating ammonia from the side chain and then finally cracking the ring nucleus containing the two atoms of nitrogen and the three atoms of carbon.

Some years before the last war histaminase was marketed by the I. G. Farbenindustrie under the name of "torantil." Great hopes were entertained on its curative action in gastro-enteritis and in allergic conditions, and encouraging reports by Rigler (1936), Horster (1936), and others were published, but subsequent papers by Miller and Piness (1940) and others have been much less optimistic, so that the drug has now been practically forgotten.

Limitations of Sulpha Drug Therapy

It cannot be denied that some cases of gastro-enteritis do get well spontaneously, especially when the diarrhoea is so profuse that the toxic products are so diluted that they are rendered harmless. The dilution is further assisted when the fluid intake, oral or parenteral, is increased. There are several reports on the good results obtained from the use of sulpha derivatives in gastro-enteritis (Anderson, 1941; Meyer, 1943), but it is common experience to find them useless in some of the severer cases (Hinden, 1948). This can be explained by admitting that if the permeability of the intestinal vascular plexus exceeds a certain critical value, then death through dehydration may occur even in the presence of an efficient sulpha drug capable of killing any causative organisms. It is obvious that no sulpha derivative can neutralize or otherwise dispose of previously formed histamine or related bodies. It is recognized that sulpha drugs are also ineffective in non-specific diarrhoeas due to virus or other unrecognized pathogens.

Antihistamines in Gastro-enteritis

Starting from the assumption that histamine was the immediate cause of the fatal dehydration found in gastro-enteritis and was responsible for many of the toxic manifestations, it was decided to treat a number of cases with an antihistamine ("benadryl" in this series) combined later with a sulpha derivative. Moderately severe and severe cases only were selected, and the criteria were: the presence of pyrexia of 101° F. (38.3° C.) or over in the rectum; more than eight stools a day; and the presence of toxaemia, as shown by the rapid pulse, dyspnoea, and prostration. Vomiting, although present in the majority of cases, was not a constant finding.

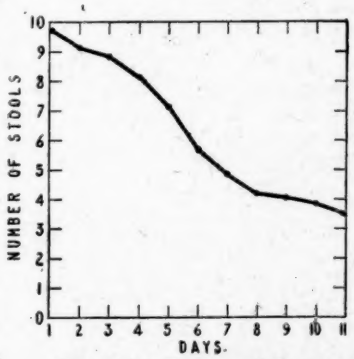


CHART 1.—Showing daily average number of stools in 24 cases treated by a short period of starvation during which various solutions were given.

The results are given in three Charts. In Chart 1 are included 24 cases treated by a short period of starvation during which half-normal saline or Hartmann's sodium lactate solutions were used orally, or Hartmann–Ringer solution parenterally. After 18 to 24 hours a proprietary buttermilk was given in gradually increasing amounts. No other medicinal measures were used. Four babies died, which gives a lower mortality than is usual in hospital cases; all cases were treated in private homes.

In Chart 2, 16 cases are reviewed, and these received the same treatment as before but with the addition of

benadryl. Parenteral infusions were not required. Although rapid diminution in the number of stools was observed the fever was often uninfluenced and the condition of some patients deteriorated when the benadryl was stopped. When a sulpha derivative was concurrently administered rapid and permanent improvement set in.

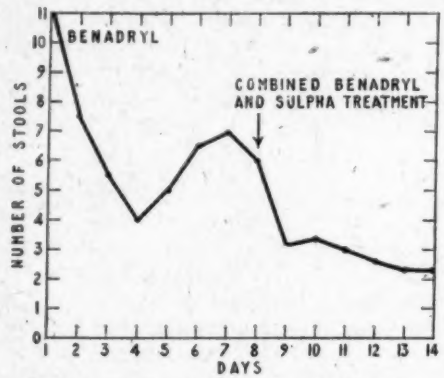


CHART 2.—Showing daily average number of stools in 16 cases treated as in Chart 1 but with benadryl and combined benadryl and sulpha drug added.

The choice of a sulpha derivative is no easy one, and so far can be considered to be largely empiric. Among the non-diffusible derivatives sulphaguanidine, sulphasuxidine, and phthalylsulphathiazole are available, while among the diffusible ones the best are probably sulphadiazine (Klose, 1947) and sulphamezathine. Blatt and his associates (1947) could discover no significant difference between the action of sulphathiazole and phthalylsulphathiazole. It is my impression, based on the observation of over 120 cases, that there is little to choose between sulphamezathine and phthalylsulphathiazole, and I always use one or the other of these two drugs.

As regards the dose of benadryl, I give 1 mg. for every month of age four-hourly, and when improvement sets in the same dose every six hours. This dosage is suitable for babies up to 5 months of age. From 6 months to 1 year the dose is 6 to 8 mg., administered in the same way.

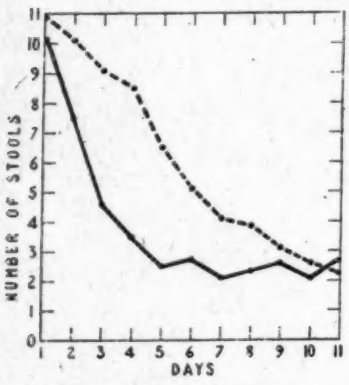


CHART 3.—Showing daily average number of stools in 42 cases treated with sulphamezathine alone (dotted line) and in 40 cases treated with sulphamezathine and benadryl (continuous line).

Chart 3 gives the results in 42 cases treated with sulphamezathine alone and in 40 cases treated with a combination of sulphamezathine and benadryl. It shows that the number of stools diminishes more rapidly when both drugs are used simultaneously, but it does not show the other favourable effects of using the combination of drugs, such as the very quick disappearance of the toxaemic symptoms. Vomiting, when present, ceases in a very short time; the prostration, dyspnoea, and tachycardia subside in most cases in a few hours. The continuous and irritating whine is replaced by a more peaceful cry; this is not surprising, as benadryl seems to have a sedative effect on the central nervous system, and in certain cases infants who have been unable to sleep owing to restlessness or colic repose quietly after a few doses. In no case was it necessary to resort to the parenteral administration of fluid; in fact, four cases among those treated showed a moderate but clearly visible generalized oedema. That this represents water retention is shown by a rapid increase of weight—as much as 200 g. or more in two or three days. The general condition of the patients is excellent, and the swelling subsides when the benadryl is stopped or the intervals between the doses are lengthened. There was only one death in the series treated with sulphamezathine and benadryl, but three deaths occurred in the series treated with sulphamezathine alone.

Conclusion

This communication is of the nature of a preliminary report, and further studies are necessary to assess the value of the combination of antihistamines and sulpha derivatives in the treatment of infantile gastro-enteritis. It is claimed that this combination does influence and materially shorten the course of the disease. Should this claim be confirmed some progress in the treatment of a distressing and often fatal condition will have been achieved.

Summary

The symptomatology of infantile gastro-enteritis can be explained, at least in part, as a manifestation of histamine intoxication.

The beneficial action of various therapeutic measures can be considered as being due to the removal or neutralization of histamine by rapid evacuation, by adsorption, or through antihistamines. Sulpha drugs, by acting on pathogenic organisms, may prevent the formation of histamine.

These measures often fail when the histamine intoxication is severe unless they destroy the histamine *in situ* or prevent the histamine from acting on the intestinal vascular plexus; only antihistamines can do this.

REFERENCES

Anderson, E. V. (1941). *J. Pediat.*, **18**, 732.
Best, C. H., and McHenry, E. W. (1930). *J. Physiol.*, **70**, 349.
Blacklock, J. W. S., Guthrie, K. J., and McPherson, I. (1937). *J. Path. Bact.*, **44**, 321.
Blatt, M. L., Plattner, E. B., Levine, M., and Melzer, F. (1947). *J. Pediat.*, **31**, 548.
Fanconi (1930). *Klin. Wschr.*, **9**, 553.
Feer, E. (1929). *Schweiz. med. Wschr.*, **59**, 925.
Feldberg, W. (1941). *Ann. Rev. Physiol.*, **3**, 671.
Freudenberg (1939). *Fortschr. Chem. org. Naturstoffe*, **2**, 1.
Glanzmann, E. (1939). *Einführung in die Kinderheilkunde*. Vienna.
Gunn, W. (1944). *Brit. J. Child. Dis.*, **41**, 1.
Heisler, A. (1928). *Dennoch Landarzt*. Munich.
Hinden, E. (1948). *Arch. Dis. Childh.*, **23**, 33.
Horster, H. (1936). *Arch. VerdauKr.*, **59**, 301.
Klose, R. (1947). *Arch. Kinderheilk.*, **133**, 175.
Martin du Pan (1945a). *Bulletin de Galenica*, No. 11.
—— (1945b). *Schweiz. med. Wschr.*, **75**, 763.
Meyer, L. F. (1943). *Acta med. orient., Tel Aviv*, **2**, 73.
Miller, H., and Piness, G. (1940). *J. Amer. med. Ass.*, **114**, 1742.
Moro, E. (1916). *Jb. Kinderheilk.*, **84**, 1.
—— (1929). *Klin. Wschr.*, **8**, 2414.
—— (1930). Ibid., **9**, 409.
Ramos (1941). *Rev. esp. Farm. Terap.*, **2**, 1.
Rigler, R. (1936). *Münch. med. Wschr.*, **83**, 15.
Rose, B., and Browne, J. S. L. (1938). *Amer. J. Physiol.*, **124**, 412.
Salomon, H. (1936). *Schlacke und Vitamine*. Vienna.
Sevitt, S. (1945). *J. Hyg., Camb.*, **44**, 37.

The Ministry of Health states that the latest figures for nursing and midwifery staffs in hospitals in England and Wales under the National Health Service continue to increase. In March of this year there were 5,600 more nurses than six months earlier, the total being 137,600. This figure includes 21,600 part-time workers—2,600 more than in September, 1948. The number of student nurses increased by 2,578 to 45,300 in the same period. The numbers of full-time midwives in hospitals rose from 4,381 to 4,813, pupil midwives from 3,184 to 3,677, and part-time midwives from 809 to 888. In the same six months full-time domestic staff increased from 99,733 to 100,514 and part-time from 23,131 to 25,065.

EXPERIENCE WITH A SYRINGE UNIT

BY

ANTHONY G. RICKARDS, M.D.

(From the Department of Pathology, Royal Lancaster Infirmary)

Many hospitals in this country are at present considering the establishment of a comprehensive syringe service. Such a unit has been in operation at this hospital for the past sixteen months, and it is felt that our experience may be of help to those about to undertake a similar service.

Method of Cleaning and Packing

Many different techniques have been tried in the sterilization and packing of syringes; the method of our choice is outlined below.

The syringes are first cleaned on the wards, and on arrival at the depot are placed in a bowl of soapy water or soapless detergent and boiled for 20 minutes. They are then rinsed in hot running water. These procedures are carried out with the piston pulled out of the barrel to about three-quarters of its distance. After rinsing well, clean warm water is drawn up and discarded with every syringe. The syringes are then dried in the hot-air oven again, with pistons pulled out to three-quarters of their distance, and, after cooling, a *little* liquid paraffin is applied to the bottom of the piston, the syringe being worked until an even coating of oil is obtained between piston and barrel.

The needles are similarly treated by boiling in soapy water, rinsing, and drying, and are then tested for sharpness and patency.

We have found that the simplest method of packing the syringes and needles is to place them in a hard glass test-tube of appropriate size containing a wad of cotton-wool on the bottom. The top of the tube is then similarly sealed with a cotton-wool plug. The method advocated by the Medical Research Council (War Memorandum, No. 15, 1945) differs from our own in that the assembled syringe is placed in a glass tube of such diameter that the barrel of the syringe is a loose fit but the flange rests on the top of the tube. The disadvantage of this latter procedure is that the top of each syringe must be covered with paper or "cellophane," tied or twisted, to keep its position. Moreover, paper subjected to the required heat often becomes very friable and cracks on handling.

The disadvantage of our method of packing is that the nozzle of the syringe is in direct contact with the plug of cotton-wool at the bottom of the tube. Sometimes pieces of wool become adherent to the nozzle and interfere with a good join between needle and syringe. This difficulty has been overcome by protecting the nozzle of the syringe with a Durham tube.

Two needles of different bore are threaded through a small slip of paper and placed in the same tube alongside the syringe in such a way that the paper prevents the points of the needles from touching the wool at the bottom of the tube.

Sterilization

Sterilization is carried out by placing the assembled units in wire baskets in a hot-air oven at a temperature of 160° C. for not less than one hour. A point of difficulty which often arises is the degree of temperature variation at different places within the same oven. The usual method of estimating the temperature is to place a thermometer through a slot in the top of the oven so that the mercury bulb is just within the cavity. It will sometimes be found that the temperature recorded this way is much lower than that at the bottom and sides of the oven, the variation being as much as 20° C. To overcome this difficulty it is best to place a thermometer in a test-tube plugged with wool and take recordings wherever it is intended to sterilize the syringes.

A further point to bear in mind is the rapid lowering of the oven temperature when cold syringes are placed within it. A considerable time may elapse before the oven regains its heat, and allowances for this factor must be made in the sterilizing time. As an alternative to dry sterilization an autoclave with drying facilities may be used. This would allow sterilization to be effected at a much lower temperature—a distinct advantage when dealing with glass-and-metal syringes.

Syringes

In the past all-glass syringes have been almost exclusively used where sterilization by hot air has been required, but several manufacturers are now producing glass syringes with metal nozzles which will withstand ordinary dry sterilizing heat at 160° C.

This syringe unit started with a stock of all-glass syringes, but these are now being replaced by the metal-and-glass types. There are two serious disadvantages to the all-glass syringe. The first is the fragility of the nozzle: approximately half of our breakages have been due to chipped glass nozzles. The second disadvantage lies in the poor join between needle and glass nozzle. This union is not as satisfactory as with the metal nozzle. A disadvantage encountered in the glass-and-metal syringe is that occasionally the solder melts at sterilizing temperature. This has not been a frequent occurrence in our experience, and when it does occur the syringe can usually be repaired by clamping it in a vertical position, applying gentle heat to the supported metal base, and allowing the solder to set again.

A recent innovation by a firm of syringe manufacturers is the production of interchangeable pistons and barrels. These, however, are as yet produced only in the all-glass type of syringe, but the innovation has much to commend it. A further point to remember is the desirability of eccentric nozzles. In syringes of 5-ml. volume and upwards eccentric nozzles are preferable to the central type, especially when using a metal-and-glass syringe. It will be found that some makes have a rather large metal base, rendering intravenous work difficult without eccentric nozzles. Some manufacturers of metal-and-glass syringes do not charge more for those with eccentric nozzles, but in other cases there is a considerable increase in cost.

Syringe Markings.—This problem has given more anxiety than any other in the syringe service. Originally it was found that the markings on the all-glass syringes had become almost invisible after six to eight weeks of constant use. The notice of the manufacturers was drawn to this fault, and they have improved the staying-power of the markings; but syringes still differ in the durability of the markings, and before large orders are placed it would be wise to test samples for this failing. Syringes with engraved markings are preferable to those of transfer type.

Number of Syringes required for the Service.—From experience it is found that three times the estimated daily turnover is the minimum number of syringes necessary to meet all requirements with efficiency. The estimation of the daily needs is a more difficult problem, and will vary with different types of hospitals. In this hospital, which has 230 beds and caters for fairly large out-patient needs,

it is found that the average daily turnover is in the region of 400 to 500 syringes.

Expenditure.—The following items of expenditure are based on the first year's experience with the service: cost of initial outlay on syringes and needles, £600; cost of replacements, £750; cost of labour, £300.

Breakages and Lost Syringes.—As will be seen from the expenditure figures, the cost of replacements has been very high during the first year's trial period, the average number of breakages being approximately 1% per day. If this rate of loss were to continue the service would hardly justify the expense. Approximately 50% of these losses were due to chipped and broken nozzles, and the introduction of metal nosepieces has proved a great saving. Moreover, to avoid clerical work, an over-generous attitude was originally adopted to the issue of syringes, but it is felt that the system is not conducive to careful handling on the part of the users, so a system has been instituted by which each ward and each department are allotted an adequate number of syringes, and sterilized units are issued only in exchange for used syringes. It is already becoming apparent that the introduction of metal-and-glass types, together with the more rigid check on the return of the syringes, is resulting in a decrease in the number of breakages.

It has been found that one person working eight hours a day is capable of servicing 300 syringes daily. This includes cleaning, assembling, sterilizing, and sharpening of needles.

Conclusion

It is hoped that this short account will save others needless expense and trouble. In particular it is emphasized that before ordering large numbers of syringes the manufacturer's claims should be thoroughly confirmed.

AMOEBIASIS IN ENGLAND AS A HOUSEHOLD DISEASE

BY

A. R. D. ADAMS, M.D., F.R.C.P.

AND

D. R. SEATON, M.B., M.R.C.P.

(From the Liverpool School of Tropical Medicine)

The recorded cases of acute amoebic dysentery or amoebic liver abscess occurring in persons who have not been out of Great Britain have for the most part been described as isolated instances, without regard to the source of the infection or of their infectivity to contacts. There have recently come to our notice three families, living in Liverpool, in each of which more than one member of the household was suffering from amoebiasis.

Case Reports

In July, 1947, we were consulted by a ship's officer who had developed dysentery during the previous few weeks. Examination of his stools showed vegetative *Entamoeba histolytica.* While receiving treatment in hospital he mentioned that his wife, who had not been overseas, had recently developed diarrhoea, and he inquired whether he might not have infected her with his complaint. He was assured that this was most unlikely, but, as his wife's diarrhoea continued, her stools were examined, and it was found that she, too, had acute amoebic dysentery.

In July, 1948, a boy aged 16 came under our care suffering from dysentery of undetermined causation which he had had intermittently for the previous two years. His stools contained blood, mucus, and numerous vegetative *E. histolytica.* This boy had dwelt all his life in a Liverpool slum. In the household were his mother, stepfather (a dock-labourer), and six other children, none of whom had lived out of Liverpool. On inquiry it was found that the boy's mother had been troubled with diarrhoea during the previous two months. Examination of her stools showed that she had acute amoebic dysentery. The remainder of the family were in good health, but it was found that the stepfather and four of the six children were passing cysts of *E. histolytica.* This family was also largely infected with threadworms, *Giardia lamblia,* and *Entamoeba coli.*

In February, 1949, a boy aged 7 was admitted under our care suffering from an intractable colitis which he had had for three years. His stools contained blood, mucus, and very large numbers of vegetative *E. histolytica.* This boy had never lived out of Liverpool. Specimens of faeces were obtained from his family, which consisted of his mother, stepfather, and three sisters. Of these the stepfather was found to be passing *E. histolytica* cysts. He had no history of dysentery, but it is of interest that he was born in India and had lived there until he was 13, since when (he is now 45) he has been in England. The remainder of the family had not been abroad.

Comment

The experience of these families serves as a reminder that amoebiasis is a condition which may easily spread in a household where personal cleanliness is not of a high order. This fact, though plain enough, has perhaps suffered from a lack of attention in this country. By contrast, French medical publications contain a number of instances of autochthonous amoebic dysentery in which association with proved carriers was established. Dopter (1917) reviews these; see also Garin and Lépine (1924).

Finally, we would stress the undesirability of diagnosing ulcerative colitis before excluding amoebic dysentery as a possible cause of the syndrome by microscopical examination of the stools by someone familiar with the appearance of *E. histolytica.* Two of the cases recorded here had been ill for years and were sadly reduced in health from the want of this precaution.

REFERENCES

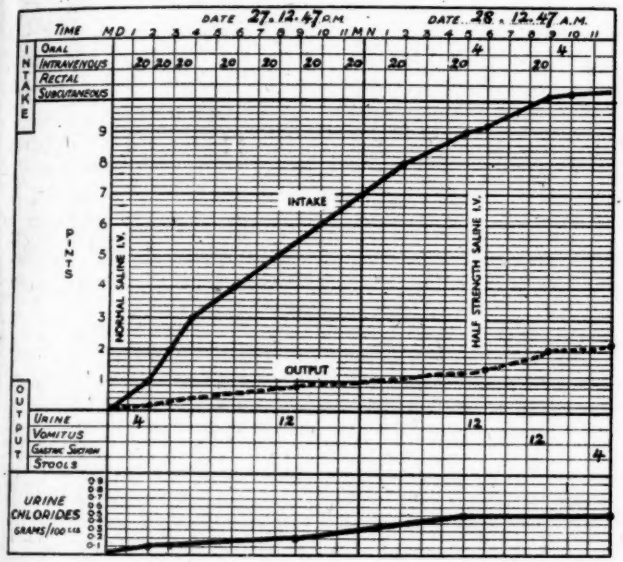
Dopter, C. (1917). *Paris méd.*, **21**, 389.
Garin, C., and Lépine, P. (1924). *Pr. méd.*, **32**, 927.

The National Tuberculosis Association of the United States has made 22 grants for research during the present year. Four of these awards are new; the remainder are for the continuance of work already started. Dr. E. R. Long, director of medical research, has given details of current work aided by the association. Professor James Waring, University of Colorado, will be investigating the modification of tubercle formation to allow better access of drugs to the bacillus. Constitutional factors responsible for resistance and susceptibility to tuberculous infection are being investigated by Dr. P. B. Sawin, of Maine, and Dr. M. B. Lurie, of Philadelphia. Dr. D. Seligson, of Vancouver, Washington, will be making a study of the blood pictures of tuberculous patients. Work on the virulence of strains of the organism and their resistance to drugs is being done by Dr. Mary Bunting, of Yale. Grants have also been made for further research into the factors responsible for caseation, and it is hoped these studies will indicate how tissue destruction in tuberculosis can be reduced. The chemistry of tuberculin is currently under examination in the Universities of Pennsylvania and Wisconsin; an investigation of moulds to discover an additional therapeutic agent against tuberculosis is being made at the University of Colorado. Most of the remaining grants are for clinical work in tuberculosis.

Medical Memoranda

Salt and Water Depletion in Surgical Practice

At the time of publication of Dr. Marriott's excellent article on the physiology and pathology of water and salt balance (*Journal*, 1947, **1**, 245, 285, 328) attempts were being made in this hospital to reorganize the methods of dealing with this problem. The opportunity was taken of putting all Dr. Marriott's recommendations into practice, including the quantitative ward test for urinary chlorides which he suggested. Enough time has now elapsed to evaluate the results; the tests have been an unqualified success. All patients who are, or have been, vomiting severely, or who are having gastric suction, are given intravenous normal saline so long as the vomiting or suction continues, or until the urinary chlorides reach the level of 0.5 g.%, at which time a change is made to half-normal saline, rendered isotonic with glucose. A third solution is in use for infants, consisting of quarter-normal saline rendered isotonic with glucose. We found that the quantitative ward test can easily be carried out by a sister or staff nurse. It may be of interest to note that faeculent, and even faecal, vomiting seems no longer to be "a sign of impending death" in many cases if intelligent intravenous therapy is carried out.



It was realized from this reorganization that the fluid charts in use at that time were not satisfactory, and consequently a new chart was evolved. As this may be of interest to others, a copy of the chart which was used over a period of twenty-four hours in a case of acute jejunal obstruction is included. Its use is best explained by these instructions, which are posted in the ward for the information of nurses:

USE OF INTAKE AND OUTPUT CHARTS

1. The chart is to be kept with the patient's notes and other charts.

2. All measurements should be recorded *on the chart* at the time of making them. It will be seen that there are spaces provided against the various methods of intake and output, and *hourly totals* (giving figures to the nearest 4 fl. oz.) should be recorded in them.

3. Each chart ends at noon, and so it is desirable that all measurements are recorded up to date then. In other words, where possible, bladders should be emptied, vomits measured, and gastric suction bottles emptied and measured, and the measurements recorded.

4. Intravenous, subcutaneous, and rectal drips should be recorded when each bottle is empty.

5. In dehydrated patients—those having normal saline—all specimens of urine should be tested quantitatively for chloride, and the result recorded. Otherwise a daily record only is required.

6. The graph, which is a summation of the nurse's records, should be made up by the sister or senior nurse only.

The sister or senior nurse constructs the two graphs (intake and output) by the addition of figures already entered by the nurses. The urine chloride graph needs no explanation.

D. T. H. PAINE, M.B., B.S., F.R.C.S.Eng.
Resident Surgical Officer.
D. R. DUFF, M.R.C.S., L.R.C.P.,
House-surgeon.
Department of Surgery,
Victoria Hospital, Blackpool.

A Case of Polyorchidism

Spermatoceles, cysts of the cord, and other scrotal swellings are apt to be mistaken for an extra testicle, but, actually, cases of polyorchidism proved by operation or necropsy are extremely rare, and Boggon (1933) in an interesting article described what he said was the twelfth case on record. The following case is therefore considered unusual enough to be worth publication.

CASE REPORT

The patient was a German physician aged 50 who came concerning a swelling in the right side of his scrotum and double herniae. In 1940 he noticed a swelling in his right groin which he knew to be a hernia. It was easily reducible, and he began to use a truss. Soon he observed that the right testicle was enlarged, and he attributed this to pressure of the truss. In 1947 he found a small hernia on the left side and began to wear a double truss. On Feb. 22, 1948, he found for the first time a new swelling in the right side of his scrotum and, fearing that this might be a malignant tumour of some kind, he sought advice. His past and family history did not have any bearing on the case.

Physical examination and routine laboratory tests did not show any evidence of other disease. He was seen to have bilateral direct inguinal herniae, small in size. The left testicle and cord appeared normal. The right testicle was four times as big as the left and was translucent. Just above the right testicle and apparently attached to the cord was a smooth oval swelling the size of a small hen's egg. It was not attached to the skin and was opaque on transillumination. There was no tenderness on pressure. The cord on both sides felt normal. Rectal examination showed a moderately enlarged prostate but no abnormality of the seminal vesicles.

The nature of the lump above the right testicle was not clear. It was thought to be a haematoma of the cord due to some trauma, a lipoma of the cord, or, possibly, a malignant tumour. A long list of all the possibilities was written down, but the list did not include what the lump turned out to be. Because of the possibility of malignancy, exploration was suggested. The patient readily agreed, and requested that the hydrocele and the herniae be dealt with at the same time.

Operation.—On Feb. 28, under spinal analgesia, an incision was made over the right inguinal canal, the cord drawn upon, and the testicle delivered. The hydrocele was dealt with by excision of the sac, and the lump above the testicle was then examined. It was smooth in outline and readily dissected from the cord, to which it was but lightly adherent. Soon it became apparent that it had a cord and a vas deferens of its own, and

this extra cord was separated up to the internal ring, ligated, and divided. Both herniae were then repaired.

The pathologist's report was as follows: "*Gross examination*:—Oval-shaped mass of tissue, size 4 by 2.5 cm., with lateral-adhering, round, long cord-like structure, thickness 1 cm., length 10 cm. No epididymis-like structure was seen. The oval mass is covered by dense white connective tissue of the appearance of the tunica albuginea. On section the tissue is yellow, lobulated, and consists of fat tissue. Only on the border near the cord the tissue is dense and whitish red. The cord tissue consists of connective tissue and blood vessels and a vas deferens. *Microscopical examination*:—Only sections from the testicle itself were examined. Sections from three different places gave the same histological structure. The tissue consists mainly of fat tissue with interspersed stroma and blood vessels. On the outer periphery is a layer of dense connective tissue and some muscle fibres. Between this outer layer and the fat is an unsharply outlined narrow space filled with an eosin-stained fibrillar material and numerous spermatogonia and spermatozoa. Parenchymatous tissue of the type of the testicular tubuli was not seen. *Diagnosis*:—Lipoma of a degenerated testicle."

The patient is a married man with one child aged 12. He reports that his sexual functions are normal in every way, and that certainly he has never been oversexed. He is positive that until a week before the operation he had never noticed any abnormal swelling, other than the hydrocele, in the scrotal region.

F. T. RANSON, F.R.C.S.Ed., F.A.C.S.

REFERENCE

Boggon, R. H. (1933). *Brit. J. Surg.*, **20**, 630.

Gastro-colic Fistula after Vagotomy for Stomal Ulcer

Bilateral resection of the vagus nerves is now often carried out in cases of stomal ulcer complicating previous gastro-enterostomy or partial gastrectomy. The following case history is therefore not without interest.

CASE REPORT

A clerk aged 49 was admitted to the Royal Victoria Infirmary, Newcastle-upon-Tyne, in October, 1948, with a history of left-sided abdominal pain for five months. Fifteen months previously he had had a partial gastrectomy for chronic duodenal ulcer. He had been perfectly well for ten months after the operation.

On examination he looked thin and anxious. There was tenderness and guarding of the left hypochondrium overlying a small ill-defined abdominal mass. A tentative diagnosis of stomal ulcer was confirmed by barium meal. The samples of gastric juice following an insulin test meal were too scanty to allow of anything but qualitative analysis. All samples contained free HCl.

Operation.—On Nov. 5, 1948, exploration showed the previous operation to have been an antecolic partial gastrectomy with distal prepyloric section. The scarred remains of an ulcer in the first part of the duodenum still remained. The probable cause of the stomal ulcer was thus not far to seek. The thickening of a stomal ulcer was palpable at the site of anastomosis between stomach and jejunum, at the lesser-curve end of the anastomosis. The small remaining prepyloric portion of the stomach and the first part of the duodenum were mobilized and excised distal to the ulcer. The duodenal stump was closed. The left lobe of the liver was then mobilized and a transhiatal bilateral resection of the vagus nerves carried out. About 2 in. (5 cm.) of each nerve was resected.

The post-operative course was complicated by diarrhoea and pronounced abdominal distension. The patient gradually improved, however, and was discharged home 18 days after operation, symptom-free.

One week later, on Nov. 30, he was again admitted to hospital. He had been well for five days after discharge, but for the last two days he had vomited after meals, and diarrhoea had accompanied the vomiting. On re-examination he looked ill and anxious. His tongue was dry and furred. The abdomen was slightly distended and there was visible peristalsis. The scar of the previous operation was soundly healed, but tenderness was again present in the left hypochondrium. Specimens of stool and vomitus were identical. A barium enema confirmed a diagnosis of gastro-colic fistula.

Second Operation.—On Dec. 3 the abdomen was again opened. A large gastro-jejuno-colic fistula was found and completely excised. The fistula involved the stomach, the efferent loop of intestine, and the transverse colon, and was obviously an extension of the stomal ulceration seen at the previous operation. Continuity was restored in the transverse colon and the jejunum. The remaining portion of stomach was further resected proximal to the stomal ulcer and anastomosed to the jejunum distal to the loop that had been repaired.

The post-operative course following the second operation was satisfactory apart from some initial collapse of the right lower lobe of the lung. The patient was again discharged home symptom-free 18 days after operation. Six weeks later he started work, and further follow-up continues.

COMMENT

It was unfortunate that no insulin test meal was carried out after vagus-nerve resection to test its adequacy. Such was the intention, but events forestalled it. The abdominal distension and diarrhoea for 14 days following this operation were signs which suggest that the nerve pathways had been suitably interrupted.

Some of the most encouraging results of vagus-nerve resection have been obtained in cases of stomal ulcer after gastro-enterostomy or partial gastrectomy. Excision of the ulcer mass followed by gastrectomy is the alternative operation. Few surgeons will disagree regarding the proportionate difficulties of the two procedures.

In this case, however, within a month of bilateral section of the vagus nerves the process of stomal ulceration at the site of a previous partial gastrectomy had proceeded to further penetration, with the development of a gastro-colic fistula.

JAMES A. KEY, M.B., F.R.C.S.,
First Assistant, Professorial Surgical Clinic,
Royal Victoria Infirmary, Newcastle-upon-Tyne.

With the introduction of death grants on July 5, 1949, the whole national insurance scheme has been brought into operation. Death grant is a cash payment of not more than £20 to help to meet the expenses connected with a death, and will usually be paid to the person bearing the funeral costs. Detailed provisions relating to death grant are contained in the National Insurance (Death Grant) Regulations which were laid before Parliament on June 27 by the Minister of National Insurance. As death grant is an entirely new benefit of State insurance towards which no contributions were paid before the new national insurance scheme began last year, there will at first be many deaths on which no death grant can be paid. It is estimated that a grant will be paid on rather less than half the deaths occurring during the next year, but the proportion of deaths on which payment can be made will gradually increase until the whole population is covered. No grant can be paid for the following deaths: (1) any death occurring before July 5, 1949; (2) the death of a man who was aged 65 or over on July 4, 1948, or the death of a woman who was aged 60 or over at that date; (3) the death under the age of 10 of any child born before July 5, 1948. A leaflet (N.I.49) explaining the conditions for receipt of a grant and how to claim one is available in local National Insurance offices and will be supplied by registrars to persons notifying a death. A special death certificate will also be provided free of charge by registrars for use in connexion with death grant and widow's benefit claims.

Reviews

CONTINENTAL HAEMATOLOGY

Bone Marrow Biopsy. By S. J. Leitner, M.D. English translation revised and edited by C. J. C. Britton, M.D., Ch.B., D.P.H., and E. Neumark, M.B., B.S., M.R.C.S., L.R.C.P. (Pp. 433; 7 plates (6 in colour), and 194 text-figures. £2 2s.) London: J. and A. Churchill. 1949.

In its original form this book was a monumental collection of the Continental literature on the subject, supplemented by the author's own views, and it is essentially a work of reference. It provides access to all the Continental literature during a period when the English-speaking world was cut off from such information. The author obviously found himself in a comparable position, for neither English nor American work receives the prominence it deserves. Those responsible for the English translation have attempted to rectify this last feature, at the same time making cuts in some of the more ponderous and pragmatic pronouncements so dear to the German mentality. In so doing the editors have thought fit to omit from the voluminous bibliography (amounting to more than 2,500 references) titles of papers which receive only brief and uncritical comment in the text. The reader is therefore left in doubt whether a reference is really worth consulting. He is also faced with the difficulty of knowing which is the pertinent reference, for there is no indication, by letter, title, or number, which is meant of the several contributions a given author has made in one year. On the whole the translation is good, but many sentences still exhibit an unwieldy Continental construction which seems strange to English ears (e.g., p. 161: "Schiappoli (1939) . . . as well as marrow hyperplasia . . . observed evidence of much extramedullary haemopoiesis in the liver and spleen").

Leitner's original text suffered greatly from his uncritical attitude towards the work of the many he had considered worthy of notice. His own observations and deductions are on the whole admirable, but he is at times prone to make dangerous teleological statements. For example, in speaking of the macropolycytes of pernicious anaemia (p. 80) he states: "Hypersegmentation may represent a compensatory process in which the body attempts to balance the reduced production of leucocytes caused by maturation arrest by keeping alive the aged cells." Most haematologists will take exception to the statement (p. 171) that, "though in myeloid leukaemia normoblasts are found in the peripheral blood, hypoplasia of erythropoiesis is present in the marrow." It is a pity that Leitner uses the term "erythraemia" as synonymous with erythroblastosis and erythroblastaemia (pp. 166–170). Such juggling with terms will cause confusion in the English-speaking community and should have been adjusted in the English translation. Despite these criticisms, and many others which might have been made, all haematologists will be indebted to Leitner for his compilation of the Continental literature, and to Britton and Neumark for making this work readily accessible in English.

LIONEL WHITBY.

PHYSIOLOGY OF VISION

The Physiology of the Eye. By Hugh Davson, D.Sc. With foreword by Sir Stewart Duke-Elder, K.C.V.O., D.Sc., Ph.D., M.D., F.R.C.S. (Pp. 451; 301 illustrations. £1 12s.) London: J. and A. Churchill. 1949.

Several books have been published recently on vision: Granit's *Sensory Mechanisms of the Retina,* Pirenne's *Vision and the Eye,* Willmer's *Retinal Structure and Colour Vision,* and Wright's *Researches on Normal and Defective Colour Vision.* All these form suitable reading for an advanced worker who is engaged in research, but are not what the student requires. They each discuss one aspect of the physiology of the eye in great detail, whereas the ideal work for the student should be less specialized. This is such a book; it is clearly written, unbiased, easy to read, and interesting. Moreover, the printing and illustrations are excellent.

The first section considers the transparent tissues—the cornea, the aqueous humour, and the crystalline lens. The mechanism of vision is discussed in the second part, which describes the retina, adaptation, and visual acuity. Section 3 gives an account of the muscles of the eye and their innervation, and part 4 contains an excellent description of visual perception, including stereoscopic vision and the perception of movement. Section 5 is devoted to the optics of the eye and the refractive errors, with their diagnosis and correction. This book is one which can be strongly recommended.

H. HARTRIDGE.

OCCUPATIONAL MARKS

Occupational Marks and Other Physical Signs. By Francesco Ronchese, M.D. Foreword by J. G. Downing, M.D. (Pp. 181; 151 illustrations. $5.50.) New York: Grune and Stratton. 1948.

This book will interest practitioners of forensic medicine and dermatologists and should be in the library of the necropsy room. Written by a dermatologist, it describes and illustrates in detail the "stigmata or marks" of occupation found on the skin and in the subcutaneous tissues. It is a summary of existing knowledge and an original contribution to clinical medicine.

In the foreword Dr. J. G. Downing says that "good physicians must be good detectives," to which Dr. Rochese adds, "This essay is not intended to make every man his own Sherlock Holmes." Every person shows positive or negative marks, especially upon his hands. "To be able to detect, solely from the legs of an individual murdered and dismembered, that it was a female, her station in life, [her] probable occupation, and [to give] valuable clues leading to her identity," was one of the author's achievements, as is noted in the introduction.

The text consists of several short chapters dealing with the general and special marks of many occupations, of sex, age, race, and social status. Particular attention is paid to the signs found on the hands of players of musical instruments, to special groups of hand-workers, to nail defects, tattoo marks, and to hair changes. One chapter describes deceptive marks and discusses legal problems, though from the American viewpoint.

Only positive marks are of value for identification: their absence means nothing. Diagnosis by these alone is a hazardous procedure. Knowledge of these indications may give a clue to the diagnosis of obscure skin lesions and aid in assessing compensation. Occupations and their techniques are constantly changing, and differ from country to country and from place to place. Individual idiosyncrasies sometimes confuse the picture, and a short absence from work may abolish the evidence. A rough classification is made of occupational marks, and is supported and illustrated by 151 figures, direct photographs or admirable line-drawings.

Most of the indications named are seen in this country, and general practitioners and housemen can make an interesting and profitable hobby out of their study. Works' doctors are familiar with them: some of them have been described in recent literature. An extensive bibliography—but a poor index—completes an admirable clinical study. When writers of detective fiction discover this book a wealth of "new clues" will be available for use—and misuse.

H. E. COLLIS.

LOCAL ANALGESIA

A Surgeon's Guide to Local Anaesthesia. By C. E. Corlette, M.D., Ch.M.(Syd.), F.R.A.C.S. (Pp. 368; 200 illustrations. £1 15s.) Bristol: John Wright and Sons. 1948.

As the name implies, this book by a surgeon is written for surgeons; its value for anaesthetists is limited. It is a guide, but not a complete manual, on local analgesia. Its ultimate aim is shockless surgery, to be achieved by local analgesia in conjunction with the use of adrenaline to act as a physiological tourniquet. The first nine chapters describing drugs, the preparation of the patient, and the preparation and measurement of materials are excellent, and will be of value to all who read them. The remainder of the book, particularly the section on anatomy and the technique of local analgesia, will appeal principally to the practising surgeon.

R. R. MACINTOSH.

ANALGESIA IN MIDWIFERY

Obstetric Analgesia and Anesthesia. By Franklin F. Snyder, M.D. (Pp. 401. £1 12s. 6d.) Philadelphia and London: W. B. Saunders Company. 1949.

This book contains a large amount of information, much of which is original and based upon experimental work performed by the author and his colleagues at the Harvard Medical School, the Johns Hopkins Hospital, and the Chicago and Boston Lying-in Hospitals. The physiology and pathology of labour are dealt with at great length—for example, the chapter on "Respiration before Birth" contains 34 pages, and that on "Intrauterine Pneumonia" 37 pages. Part 2, which starts at page 213, is devoted to the treatment of pain during labour, and the various methods of general and local analgesia are considered in detail. Recent developments such as fractional caudal block are discussed, but curiously enough no mention is made of trichlorethylene.

This book will be invaluable to advanced specialists and research workers, but the casual anaesthetist or obstetrician may be somewhat disappointed, as theoretical considerations are given precedence over the practical details of individual techniques.

C. LANGTON HEWER.

CATHOLIC PSYCHOLOGY

The Driving Forces of Human Nature and Their Adjustment. By Thomas Verner Moore, Ph.D., M.D. (Pp. 461; illustrated. $6.50 or 35s.) New York: Grune and Stratton. London: William Heinemann Medical Books.

Father Moore is well known as the chief authority on psychology from the Catholic standpoint in the United States. The present volume is a complete and erudite exposition of this approach to the subject. After a historical introduction the subject matter is treated from the intellectual, emotional, and volitional aspects, and the biological, physiological, factorial, and philosophic contributions are all duly considered. As might be expected, more stress is laid on the importance of intellectual drive and control than might be met with in a similar treatise by a non-Catholic psychologist. To the latter, therefore, the approach might seem too didactic and somewhat superficial. Such an attitude may, however, be salutary when dealing with the normal individual and is to be criticized only when the subject is abnormal and suffering from psychoneurosis or psychosis. Nevertheless, Father Moore pays attention to Freud's work and his doctrines of conflict, repression, and regression, but he considers that Freud's more extreme doctrines of universal sexuality in deeply unconscious motivation apply only occasionally and to a few cases.

Medical readers will perhaps find most interest in the section on psychosomatic diseases and the visceral neuroses, which are adequately examined without the addition of any fresh concepts. In the section on volition there is, of course, a considerable weight of argument from Catholic philosophers brought to bear in an attempt to prove that human beings are provided with complete freedom of will. Again, the non-Catholic psychologist will find it difficult to follow the author with full confidence, but nevertheless the argument culminating in a discussion on the adjustment of man to God is well worth careful perusal. This is a valuable addition to psychological literature and will certainly repay the medical psychologist if he reads the whole 460 pages.

R. G. GORDON.

The sixth edition of Dr. Israel Wechsler's *Textbook of Clinical Neurology* (pp. 829; £2 2s.; London: W. B. Saunders Company) is as succinct as its predecessors, although many new facts have been added to its crowded pages. An excellent and extensive index simplifies reference, and on the page the facts are clearly stated in succinct sentences. There must be many examiners who would welcome such a prose style in their papers. Among the modifications is an opportune addition to the chapter by Dr. David Wechsler on psychological diagnosis which could with advantage be enlarged still further in later editions. Both psychometric examination and personality testing are now so important as parts of neurological case taking that detailed instruction about them is valuable and has a place in a book of this status. The work can once more be recommended to students of neurology.

BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

Manuel Pratique de Rhumatologie. By G. Kahlmeter. (Pp. 134. No price.) Paris: Expansion Scientifique Française. 1949.

Les Fibres Textiles dans le Monde. Organisation des Nations Unies pour l'Alimentation et l'Agriculture. (Pp. 217. $1.00.) Washington: Bureau Régional Européen de la FAO. 1948.

Pancreopatias Agudas no Dramaticas. By A. A. Ayala. Vols. 1 and 2. (No price.) Barcelona: Byp. 1948.

Lobes et Zones des Poumons. By J. Schaepelynck. (Pp. 104. 275 francs.) Paris: Librairie Maloine. 1948.

Zur Sozialen Hygiene. By A. Niedermeyer. (Pp. 197. Sch. 54.) Vienna: Wilhelm Maudrich. 1949.

Signpost on the Frontier. By R. J. H. Cox, M.B., B.S. (Pp. 70. 2s. 6d.) London: Church Missionary Society. 1948.

Lectures to Chiropodists. Collated by F. Charlesworth, F.Ch.S. (Pp. 225. 10s.) London: Charlesworth and Wiles. 1949.

Psychologia Marzenia Sennego. By T. Bilikiewicz. (Pp. 325. No price.) Gdansk: A. Krawczynski 1948.

Traitement Chirurgical de L'Hypertension Artérielle. By M. Luzuy and J. F. Porge. (Pp. 160. 500 francs.) Paris: G. Doin. 1948.

Tabulae Biologicae. Edited by H. Handovsky. Vol. 19, Part 3. (Pp. 316. No price.) The Hague: W. Junk. 1948.

Hallux Valgus. By C. Khoury. (Pp. 227. No price.) Buenos Aires: Lopez and Etchegoyen. 1947.

The Food of the People. By Sir N. Curtis-Bennett. (Pp. 320. 16s.) London: Faber and Faber. 1949.

Shadows in the Sun. By S. Taylor, M.D., M.P., and P. Gadsden. (Pp. 187. 15s.) London: George G. Harrap. 1949.

Child Development. By M. E. Breckenridge, M.S., and E. L. Vincent, Ph.D. 2nd ed. (Pp. 622. 20s.) London: W. B. Saunders. 1949.

Symptoms in Diagnosis. By J. C. Meakins, C.B.E., M.D., D.Sc., LL.D. 2nd ed. (Pp. 542. 42s.) London: Baillière, Tindall and Cox. 1948.

Structure and Function as Seen in the Foot. By F. W. Jones, D.Sc., M.B., B.S., F.R.S., F.R.C.S. 2nd ed. (Pp. 333. 25s.) London: Baillière, Tindall and Cox. 1949.

Biological Applications of Tracer Elements. Cold Spring Harbor Symposia on Quantitative Biology. Vol. 13. (Pp. 222. $7.00.) New York: Biological Laboratory. 1948.

Gas and Air Analgesia. By R. J. Minnitt, M.D., D.A., F.F.A. R.C.S. 4th ed. (Pp. 86. 5s.) London: Baillière, Tindall and Cox. 1949.

The Parathyroid Glands and Metabolic Bone Disease. By F. Albright, A.B., M.D., and E. C. Reifenstein, jun., A.B., M.D., F.A.C.P. (Pp. 393. 44s.) London: Baillière, Tindall and Cox. 1948.

Recent Advances in Oto-Laryngology. By R. S Stevenson, M.D., Ch.B., F.R.C.S.Ed. 2nd ed. (Pp. 395. 24s.) London: J. and A. Churchill. 1949.

The Business Side of Medical Practice. By T. Wiprud. 2nd ed. (Pp. 232. 17s. 6d.) London: W. B. Saunders. 1949.

Why Our Children Die. By S. D. Onabamiro, B.Sc., F.L.S. (Pp. 196. 8s. 6d.) London: Methuen. 1949.

Minor Surgery. Edited by Sir H. Ogilvie, K.B.E., D.M., M.Ch., F.R.C.S., and W. A. R. Thomson, M.D. 2nd ed. (Pp. 192. 14s.) London: Eyre and Spottiswoode. 1949.

Bronchiogenic Carcinoma and Adenoma. By B. M. Fried, M.D. (Pp. 306. 33s.) London: Baillière, Tindall and Cox. 1948.

BRITISH MEDICAL JOURNAL
LONDON
SATURDAY JULY 16 1949

AETIOLOGY OF INFANTILE ENTERITIS

Diarrhoea and vomiting in infancy is a syndrome rather than a specific clinical entity. Textbooks on paediatrics classify the condition under such broad headings as dietetic, parenteral, and infective, though in the last group accepted intestinal pathogens are rarely isolated from infants (with enteritis) under 1 year of age. However, in any diarrhoeal condition search should always be made for salmonella and dysentery organisms, nowadays easily and quickly identified, and for giardia. Sonne dysentery is particularly dangerous in an institution because of its high infectivity; giardia infection, causing a less acute diarrhoea, may go smouldering on in a nursery for weeks before attention is drawn to it; and recent evidence suggests that salmonella infection may not be so rare in infancy. Thus an outbreak of gastro-enteritis affecting 68 children, of whom 56 were under 1 year of age, occurred in a hospital population in Melbourne[1] and was apparently attributable, in part at least, to dust-borne contamination of food and food utensils.[2] In most institutional outbreaks, however, the most painstaking investigations have usually failed to demonstrate any specifically recognizable bacterial pathogen, so that the possibility has been considered that a virus may be the cause, particularly in the epidemic diarrhoea of the newborn, which workers in the U.S.A. have been inclined to regard as a disease *sui generis*.

In Britain attempts, both published and unpublished, to demonstrate virus in faeces or other material from newborn and older infants have been unsuccessful. Drs. Joan Taylor, B. W. Powell, and Joyce Wright, in a paper published elsewhere in this issue, refer to investigations by Dr. F. O. MacCallum. In extensive animal tests with tissues removed from four fatal cases of infantile gastro-enteritis he was unable to find any evidence in favour of a virus aetiology. It should, however, be emphasized that there are at least two forms of neonatal diarrhoea; the type that affects both mother and infant may well be due to a virus, as American investigations have suggested.

The view that certain Gram-negative bacteria, including the paracolon group, the proteus family, of which Morgan's bacillus is a member, and *Ps. pyocyanea*, may be causally related to infantile enteritis has long been held by different workers, but the fact that these bacteria are common concomitants in diarrhoeas due to other known causes and the difficulties of their specific identification have prevented general acceptance of their aetiological significance. Lately, close study of the serology of the lactose-fermenting coliform group by Kauffmann[3] and his colleagues has indicated that a few of the many serological types may be potentially more pathogenic than others, for 2 or 3 types were preponderantly present in cases of urinary infection, cholecystitis, and appendicitis. The first indication that a specific strain of *Bact. coli* may be associated with infantile enteritis came from Bray,[4] who isolated a serologically specific late maltose-fermenting organism with a characteristic seminal smell from 42 out of 44 infants admitted to hospital with "summer diarrhoea": he failed to find a similar organism in 100 contact infants without diarrhoea. Then, in the Aberdeen outbreak of gastro-enteritis in the spring of 1947, Giles and Sangster[5] identified a single serological type of *Bact. coli* in the faeces of 86 out of 92 infants suffering from the epidemic infection and from only five out of 116 infants with "parenteral" diarrhoea or mild infections not requiring hospital treatment. This organism was rarely isolated from healthy children or adults, but it was found in the faeces of four infants who twenty-four hours later developed diarrhoea.

Meanwhile a team of bacteriologists and paediatricians (the authors of the report in this issue), working with the support of the M.R.C. at the Hospital for Sick Children, Great Ormond Street, and the Central Public Health Laboratory, Colindale, had set themselves the task of investigating clinical, epidemiological, and bacteriological aspects of institutional outbreaks of infantile enteritis in maternity units and residential nurseries. The first of these outbreaks affected 20 babies (with 14 deaths) in the maternity unit of a Derbyshire hospital; 15 of the babies were bottle-fed, four partially breast-fed, and only one fully breast-fed. The outstanding symptom was diarrhoea with severe dehydration, preceded in some cases by lethargy, reluctance to feed, and loss of weight. The age at onset varied from 6 to 20 days. Rectal and nasopharyngeal swabs were obtained from nine acute cases, and from each of them a serologically specific *Bact. coli*, labelled D 433, was isolated. The same coliform organism was isolated from 10 babies (all artificially fed) who developed acute diarrhoea and vomiting in a mothers and babies' hostel in Middlesex, and again from eight affected babies in the same hostel eight months later. *Bact. coli* D 433 was also found

[1] Mushin, R., *J. Hyg. Camb.*, 1948, **46**, 151.
[2] Rubbo, S. D., ibid., 1948, **46**, 158.
[3] *J. Immunol.*, 1947, **57**, 71.
[4] *J. Path. Bact.*, 1945, **57**, 239.
[5] *J. Hyg. Camb.*, 1948, **46**, 1.

in the faeces of four babies living in a residential nursery in Hertfordshire where there was an outbreak of enteritis, and in 21 out of 23 infants who developed intercurrent diarrhoea, usually in small groups, in a children's hospital, but in none of 14 babies with mild intercurrent diarrhoea in a residential nursery and irregularly (6 out of 14 cases, 5 out of 24 cases) among children admitted to two hospitals with a diagnosis of gastro-enteritis. Further evidence suggesting an aetiological relationship of this organism to infantile diarrhoea was its disappearance from affected cases during convalescence, its appearance after relapses in infants not previously yielding positive cultures, and its absence from a large series of control healthy and sick babies. It was rarely found in the faeces of healthy adult contacts, but was found in nine out of 34 contact babies, none of whom later developed any clinical infection. It is noteworthy that the strains of *Bact. coli* isolated by Bray, by Giles and Sangster, and by Taylor and her colleagues were all serologically identical.

When a particular member of a family of organisms that normally live as saprophytes in the body is singled out as a possible pathogen the evidence must be specially convincing before its pathogenicity is accepted. A parallel to the present problem of the relationship of one or more serological types of *Bact. coli* to infantile enteritis may be drawn from the pneumococcus family. Pneumococci are present in the throats of 30–60% of healthy individuals, and scepticism about their pathogenicity would have been justified if it was not known that there are many different serological types, only a few of which—e.g., types 1, 2, 5, and 7—have epidemic propensities and are specifically associated with the communicable disease lobar pneumonia. These types are rarely found in the normal throat: on the other hand, certain types—6, 19, 23—are common in the throats of healthy children, and these same types are frequently associated with bronchopneumonia, which affects mostly young children with poor resistance to infection. Bronchopneumonia may therefore be regarded as an endogenous non-communicable infection and lobar pneumonia as an exogenous infectious disease. It may be permissible to postulate a similar division for infantile enteritis—the sporadic cases resulting from parenteral infection or other predisposing cause being associated with the endogenous coliform types, while outbreaks would be caused by the less frequent "epidemic" strains. Attempts to put such a hypothesis to the test would have to take into consideration the intricate serology of the coliform group, the difficulties of isolation and recognition of specific types, and the search for a suitable animal on which to test pathogenicity; the absence of an acute inflammatory reaction in the gut or the development of specific antibody in the affected infant; and the mode of spread of the infection and its selective attack on artificially fed babies under 1 year of age. But the quickening of interest in both the aetiology and treatment of this serious infection, illustrated by the two papers in this issue, augurs well for its better control in the future.

EXCHANGE TRANSFUSION

The idea of exchange transfusion is an old one. Nearly three hundred years ago a list was published in the Philosophical Transactions of the Royal Society of London[1] of some of the possibilities of transfusion which trials could settle. No. 8 was as follows: "Whether a dog that is sick of some disease chiefly imputable to the mass of blood, may be cured by exchanging it for that of a sound dog." In the experiments of those times various animals were used, and since the donor could be sacrificed the exchange could be massive. The quantities necessary to secure various degrees of exchange in man have been estimated by Wiener and Wexler.[2] If blood is continuously withdrawn from a patient's circulation while the blood of a donor is infused into a different vein at an equal rate, the infusion and withdrawal of an amount of blood equal to twice the patient's blood volume will achieve about an 86% exchange; thus after transfusion and withdrawal of some 10 pints (5.7 litres) of blood from an adult only 14% of the patient's own blood will be left in his circulation.

It is evident that large-scale exchange transfusions can be performed on adult humans only when many blood donors are available. This is doubtless the reason why it is only recently, with the organization of large blood-transfusion centres, that the operation has been practised in any systematic way.[3] However, it is an easier procedure in an infant. The blood volume of a newborn infant is only about one-twentieth that of an adult: an adult can therefore harmlessly donate an amount of blood twice as great as the entire blood volume of an infant. Many methods of carrying out exchange transfusion in infants have been suggested, but that of Diamond[4] seems to be the simplest and best. Within a few hours of birth a fine plastic catheter is passed up the umbilical vein, and blood is withdrawn and replaced by that of the donor in small successive steps. The route that may be taken by the catheter is well illustrated in the article by Dr. J. J. van Loghem and his colleagues which appeared in last week's issue.

[1] *Phil. Trans. Roy. Soc. Lond.*, 1665–6, **1**, 387.
[2] *J. Lab. clin. Med.*, 1946, **31**, 1016.
[3] Bessis, M., and Bernard, J., *Sang*, 1948, **19**, 40.
[4] *Proc. R. Soc. Med.*, 1947, **40**, 546.
[5] Wallerstein, H., *Amer. J. Dis. Child.*, 1947, **73**, 19.
[6] Mollison, P. L., and Cutbush, Marie, *Lancet*, 1948, **2**, 522.

Exchange transfusion in infants has been practised almost exclusively for haemolytic disease of the newborn. In this condition, at birth and for a variable time afterwards, the infant's own (Rh-positive) erythrocytes are being haemolysed rapidly. Rh-negative erythrocytes are not susceptible to the haemolytic process, and the anaemia may be successfully combated by simple transfusion of Rh-negative blood. If massive transfusions of Rh-negative blood are given the infant's own erythropoiesis dies down, and for a few weeks practically no Rh-positive erythrocytes are to be found in the circulation, the infant relying almost entirely on the transfused erythrocytes. When this method of treatment is carried out it is a few days before the Rh-positive erythrocytes disappear from the circulation, and with exchange transfusion an attempt is made to remove almost all the Rh-positive erythrocytes during the period of the transfusion and thus leave the infant with only a few of its own erythrocytes. At least three possible advantages have been claimed for this operation: first, that it diminishes the likelihood of the development of kernicterus,[5] a toxic state which reaches its climax two to five days after birth and usually causes the death of the infant; secondly, that it diminishes the risk of overloading the circulation of severely anaemic infants; and, thirdly, that it simplifies treatment by enabling a sufficient number of Rh-negative erythrocytes to be introduced into the infant's circulation at a single operation so that no subsequent transfusions are needed.[6] This last claim seems to be the most soundly established, though the expeditious performance of the operation is likely to be achieved only in highly specialized centres.

Dr. van Loghem and his colleagues report a fatality rate of 22.5% in 160 infants treated by exchange transfusion. They contrast this figure with a fatality rate of 63.5% in a group of 88 infants not treated by exchange transfusion. These infants were elder siblings of some of those included in the "exchange" group; no details of their treatment are given, and the authors state, "It is impossible for us to compare the mortality rate of icterus gravis treated by simple blood transfusion with that of cases treated by exchange transfusion." At first sight it would seem that the findings of such a difference in fatality rates made any further trials unnecessary, but this conclusion may not be so well founded as it appears. First, some years ago icterus gravis was diagnosed only in cases which would now be considered as moderate or severe, whereas to-day cases are sometimes included in a series when the diagnosis is based entirely upon laboratory findings, such as a positive direct Coombs's test. Evidently, then, if the mortality of the disease a few years ago were to be compared with that of an untreated series collected to-day an apparent fall would almost certainly be noted. The second difficulty in making a comparison between a series treated "then" and "now" is that inherent in all comparisons of this kind: factors unconnected with exchange transfusion may help to lower mortality—for example, the availability of penicillin. Finally, though exchange transfusion is certainly better than no transfusion, the real point of interest is whether it is better than simple transfusion, and on this point there is still no good evidence.

The question whether the prognosis for a severe case of haemolytic disease of the newborn is improved by giving an exchange transfusion rather than a simple transfusion is an important one to solve. The successful performance of exchange transfusions demands special zeal on the part of the operator. The transfusion must be carried out within a certain time of birth and the operator must be prepared to undertake it at any time of the day or night. He cannot be expected to do this if it is likely that the infant has just as good a chance of recovery if treated by a simple drip transfusion of Rh-negative blood. It is to be doubted whether the relative merits of the two procedures can be settled by anything short of a properly controlled statistical trial in which the same investigators try out both methods of treatment in parallel. Nevertheless, such careful records as those of van Loghem and his colleagues provide invaluable data for those intending to practise exchange transfusion.

HIGH-VOLTAGE X RAYS

Installation has been completed at the Royal Cancer Hospital of the first of the two 30-million volt synchrotrons which, as made known in July, 1947,[1] have been under construction for the Medical Research Council. The second has been allocated to the department of radiotherapeutics in the University of Cambridge. Their function is to provide *x* rays of comparable voltage, at first for physical and biological research and later for therapeutic use in the irradiation of deep-seated cancers. Their advantage, compared with conventional *x*-ray sources, is that depth dosage is considerably increased compared with skin dosage.[2] It should therefore be possible to administer greater dosages to deep tumours without corresponding increase in the risk of surface injury. Much experimental work, extending probably over about a year, will be needed before the apparatus is used for treatment.

The synchrotron is in a basement laboratory which forms part of the physics department of the hospital under Professor W. V. Mayneord. The opening ceremony was on July 5, and the demonstrations which were given illustrated also the general work of the department

[1] *British Medical Journal*, 1947, **2**, 101.
[2] Ibid., 1947, **1**, 571.
[3] Ibid., 1946, **2**, 951.
[4] Ibid., 1948, **1**, 554.

in the application of nuclear physics to medicine. Subjects included the use in animals of cobalt-60 (Co^{60}) —the most probable artificial substitute for radium[3]; autoradiography as a research method, with the distribution of radioactive materials in tissue sections shown by the blackening of photographic films with which the tissue sections have been brought into contact; and the handling and clinical use of radio-isotopes. Devices for the remote control of radio-isotopes were shown, some of which have been designed and constructed in the department, and also a number of instruments specially designed for clinical work, and the clinical techniques used with radioactive sodium and iodine.

In the synchrotron, as in other *x*-ray sources, the generation of *x* rays is due to impact on a solid target of a beam of electrons which has previously been accelerated to a high energy.[2] The differences are in the level of energy to which the electrons are accelerated and the means used to accelerate them. Instead of being a "tube" in the ordinary sense of that word the synchrotron has the external form of a cylinder approximately four feet (122 cm.) in diameter. This is because the electron beam is accelerated round a circular track which is many times repeated. The earlier stages of acceleration are magnetic. The later stages are electrical—the accelerating force being arranged to vary in synchronism with the rotating electrons. Hence the name of the instrument. A further point of difference is that whereas a normal *x*-ray source is continuous the synchrotron operates on a pulse principle. It provides 50 pulses of high-energy electrons per second, and the same number of *x*-ray pulses—the duration of each pulse being some millionths of a second. In consequence, though the energy of the *x*-ray beam is very high, the average dosage rate is not high (probably about 10 roentgens per minute at one metre). The electron energies are expected to reach 30 million volts—which is the design figure—but the mean energy of the *x*-ray beam will necessarily be lower, because the electrons are not instantaneously brought to rest on hitting the target, but on the average penetrate it to an appreciable extent before their energy is converted into *x* rays. In other words, there is some loss of energy before *x*-ray generation takes place. This is the case with any form of *x*-ray source.

The first stage of investigation will be to define the physical limits of the *x*-ray beam. At the same time the efficacy of the initial protection which has been provided will have to be investigated, and any further steps which may be necessary must then be taken. This will involve a detailed series of measurements which may well extend over some months. Thirdly, it will be necessary to distinguish between stray electrons which have escaped from the synchrotron and the *x*-ray beam which it is its main function to supply. Only when this has been done can the beam itself be seriously studied. In this connexion Professor Mayneord and Dr. J. H. Martin of his department have been making measurements during the past two years on synchrotrons and betatrons —an earlier type of electron accelerator[2]—both in Great Britain and the United States. Their observations, soon to be published, afford the first comparison in internationally agreed units between the physical results obtained in the two countries.

In the second stage of investigation two related studies will be carried out. One will be of the depth dosage in a "water phantom" which adequately reproduces the course of absorption in the body. The other will be of the range of energies included in the *x*-ray beam. Finally, though the beam itself will be comparatively narrow, with the effective dosage falling off to half at a distance of some degrees off centre, it is likely that means for further canalizing the beam will also be considered. In the next stage the biological effects of the rays on a number of organisms, animals, and specific tissues will be observed. It is hoped in particular to study the effects on tissue cultures, in association with the Chester Beatty Research Institute of the Royal Cancer Hospital and other organizations, including the Strangeways Laboratory at Cambridge. Apart from the extension of the energy level at which such measurements have been made there is the further question of pulse irradiation—the repeated administration of a high dosage rate over very short periods.

A proposal for a gimbal-mounting,[4] which was discussed at an earlier stage, has been deferred until after the experimental period. The effect would be that the direction of the beam could be altered, as in *x*-ray installations generally. It is hoped in any case that the present site will be a temporary one.

The scientific development of the synchrotron has been largely due to a section of the Telecommunications Research Establishment, Great Malvern, which now forms part of the Atomic Energy Research Establishment at Harwell. The magnets and much of the electrical gear have been built by the English Electric Company, Stafford, in consultation with T.R.E., which is also responsible for the electronics. Development costs have been borne by the Medical Research Council. The hospital itself undertook the conversion of an old building to house the synchrotron and with the Medical Research Council has developed a fairly large centre for research in nuclear physics applied to medicine. There has been close co-operation for many years between the radiotherapeutic and the physics departments of the Royal Cancer Hospital. It is recognized to be essential in the present work that the closest touch be maintained between the clinic and the research laboratory.

ARBITRATION

On behalf of the Joint Committee representing consultants and specialists Sir Lionel Whitby, its chairman, in a letter to the Ministry of Health on July 5 asked for the establishment of a permanent negotiating machinery for consultants and specialists in the National Health Service. He also asked that the Minister or the representatives of the profession should have the right in the event of disagreement to refer for arbitration any matter within an agreed range of subjects, both parties to be bound by the award of the arbitrator. The agreed range of subjects should include any terms and conditions of service affecting remuneration. The Joint Committee also seek discussion on facilities for private treatment in hospital and for information about the payment of part-time clinical teachers. Until these matters are settled the Joint Committee advises consultants and specialists not to sign permanent contracts.

Of the three points in Sir Lionel's letter the one of outstanding importance is that on arbitration. We print in this week's *Supplement* the reply of the Ministry of Health to the Joint Committee. In this Sir William Douglas, secretary to the Ministry of Health, observes that the Ministry wants a permanent negotiating machinery, which, it is thought, should be established as a medical section of the Whitley mechanism. Sir William Douglas continues thus: "But you also want to add an absolute right to the medical profession, in the event of disagreement in discussion (within a prescribed range of subjects including remuneration), to refer the dispute to arbitration—both parties then to be bound by the arbitrator's decision. Here we certainly diverge from you, but more in the principle involved than what we conceive as likely actually to happen." Sir William draws attention to Clause 12 in the Amending Bill as providing the medical profession the same rights of arbitration already available to any other profession or trade. He points out that arbitration would be by mutual consent, although there are surviving wartime powers which go beyond this and which can be used by the medical profession so long as they are in force. The position, therefore, seems to be that the Ministry of Health agrees that there should be permanent negotiating machinery backed up by arbitration by mutual consent. It is not prepared to agree to *compulsory* resort to arbitration.

In the Committee Stage of the National Health Service (Amendment) Bill Mr. Aneurin Bevan made this important statement: "If both sides agree to go to arbitration, obviously the Minister would accept the consequences." The fixing of fees was not a matter upon which he could agree beforehand to go to arbitration. As those employed in the National Health Service were in contract with the Executive Councils or Regional Hospital Boards the employees were not Civil Servants and not in direct contract with the Crown. What was involved was a very substantial proportion of the budget. "We could not over this vast field . . . say beforehand that Parliament should put it out of its power to consider the fiscal consequences of an arbitration. If that were done I think it would be unconstitutional. That is why I am not agreeing beforehand to compulsory arbitration over the whole field. . . ." He reiterated later that if the Minister went to arbitration this involved acceptance of the results. A regulation would be laid before the House of Commons with the recommendation of the Government behind it. Only in the most exceptional circumstances would the House of Commons use its power to throw the regulation out, but it must have that residual right.

Conservative M.P.s in subsequent discussion agreed with Mr. Bevan that arbitration should not be made compulsory. Sir Hugh Lucas-Tooth, for example, observed that he did not quarrel with Mr. Bevan "in asserting that, subject to the general control of the House of Commons, he must retain control on these decisions." But he added that it would be unfair if the employer had the right under the Industrial Courts Act to insist on arbitration if the employed did not have an equal right. Mr. Bevan said later that under the Acts mentioned in Clause 12 there was no provision for compulsory arbitration. Referring to Sir Lionel Whitby's letter to *The Times* of June 20 and the quoted statement in it that "a code of conduct is unlikely to be arbitrable, but a simple proposal for a change in wages or salary almost certainly is," Mr. Bevan said, "I have not altered that statement. That still stands. I have not departed from that." He went on to say that under the two Acts referred to in Clause 12 mutual consent was necessary before arbitration took place: "I could not take the medical profession to arbitration if they did not want to go; they could not take me if I did not want to go; so we are on terms of complete equality here." Mr. Arthur Howard (Conservative M.P. for Westminster) pleaded that the Minister should make clear in a public statement that it was his intention to see that behind the conciliatory machinery there should be a second independent and impartial body to which either side should have the right of referring a matter in dispute. In Mr. Bevan's view the Conciliation Act of 1896 provided a number of agencies for reaching a settlement under mutually agreed arbitration, and he added that it was intended to establish a special Division of the

Industrial Court to deal with the National Health Service. Mr. Walter Elliot said that a misunderstanding had arisen and that it was a great pity that as late as June 20 this year "the negotiating body should still be in doubt as to what had been decided or proposed to them so long ago as October, 1947." He stressed that in the case of the medical profession the employer could legislate and was also negotiating with a body of employees who had declared that in no circumstances would they go on strike. When he was asked by Mr. Bevan whether on behalf of the Opposition he thought that there should be compulsory arbitration, Mr. Elliot replied, "No. Every hon. Gentleman who has spoken on this side has said no, because it is not possible." Mr. Elliot went on to say that they were trying to secure something in place of the power of compulsory arbitration, and he considered that the Minister's suggestion to create a special section of the Industrial Court concerned with the National Health Service was a step in advance.

The Joint Committee and the Central Consultants and Specialists Committee have asked for compulsory arbitration, and the reasons for it are well known. The medical profession, as Mr. Elliot observed, is in a different position from that of any other section of the community in that by the nature of its work it is unable to use the weapon of the strike. Nevertheless both the present Government and the Opposition, while agreeing on the need for arbitration machinery, refuse to allow it to be compulsory. This question is a matter which the Joint Committee will have to consider seriously when it meets representatives of the Ministry of Health. It is not clear what is meant by the last paragraph of Sir William Douglas's letter, and we should be reluctant to put on it what seems to be an obvious interpretation—namely, that unless matters are speedily settled the terms and conditions of service will not be made retrospective.

THE ONSET OF MENSTRUATION

Although the first menstrual period does not mark the beginning of the changes in physical development associated with the maturation of the genital system, it is an important landmark, since the age at which it occurs is easily ascertained. Elsewhere in this issue Drs. D. C. Wilson and I. Sutherland describe an investigation undertaken by the Institute of Social Medicine into the age of onset of menstruation in a cross-section sample of 1,338 girls in schools of Oxford city and county. As a survey it provides interesting indications about differences between menstruating and non-menstruating girls of the same age, particularly their height–weight ratios. Contrary to popular belief, these workers found that little difference existed between the age of the menarche of girls living in the town and in the country, and that the age incidence had not altered appreciably during the course of the last generation. The significance of the inquiry lies in the findings of the differences in the heights and weights between menstruating and non-menstruating girls in relation to their ages, and it thus confirms the work of Ellis.[1] To know that there is a mean difference of 3 in. (7.5 cm.) in height and of 25 lb. (11.34 kg.) in weight at the age of 11–12 and 1½ in. (3.75 cm.) and over 17 lb. (7.7 kg.) at the age of 15–16 is of some importance for purposes of research (particularly from records) on growth curves of large numbers of children. At the individual examination of girls, however, the clinical manifestations of puberty are so obvious that it would be unlikely for anyone to confuse the overweight child with the pre-pubescent one. If average curves for height and weight are used for comparative purposes it would seem that two curves should be substituted for the one commonly in use—one for those who have reached the menarche and one for those who have not. Even then these curves can be misleading, since the individual child's pattern of growth must be taken into account when comparison with the average curve is made.

Drs. Wilson and Sutherland found no evidence that the height and weight of girls aged 17 and 18 are in any way related to the age at which they first menstruated. The mean height and weight of girls (at the age of 17–18) who began to menstruate at 15 years and over were 65.1 in. (163 cm.) and 125.4 lb. (56.9 kg.); the figures for girls of the same age who began to menstruate at ages under 13 were 64.4 in. (161 cm.) and 125.4 lb. (56.9 kg.). This finding contrasts with that of Shuttleworth,[2] who found in a small group of girls that there was a rapid decrease in the rate of growth after the onset of menstruation. Girls whose menarche was later continued to grow after the height of those who had already begun to menstruate had become nearly stationary; in consequence those in the former group eventually overhauled the girls whose menarche was earlier and who were on the average taller during the period from 8½ to 12 years of age.

The sample studied by Drs. Wilson and Sutherland is not very large, and the figures obtained in a comparatively small city, favourably placed, together with a restricted rural area, may not necessarily correspond with those which would be obtained in densely populated or industrial areas. Further confirmatory evidence is necessary before the findings can be accepted for the country as a whole. The investigation, however, does provide information which medical practitioners, especially school medical officers, should bear in mind. The omission of any mention of the age of onset of the menarche in the school medical record card issued by the Ministry of Education must have been an oversight which no doubt will be remedied in due course. Though this information is unlikely to have much value at the ages of the three statutory examinations, it is of retrospective value and should be included.

[1] *Arch. Dis. Childh.*, 1948, **23**, 17.
[2] Monograph of the Society for Research in Child Development, 1937, **2** (5), National Research Council, Washington.

BRITISH CONGRESS OF OBSTETRICS AND GYNAECOLOGY

TWELFTH MEETING IN LONDON

The twelfth British Congress of Obstetrics and Gynaecology was held at Friends House, London, on July 6, 7, and 8, under the presidency of Sir EARDLEY HOLLAND. Normally the Congress takes place every second or third year, but this was the first since that held in Edinburgh in 1939. Seven hundred members registered, four times as many as on the previous occasion.

The Congress was declared open by the MINISTER OF HEALTH. There was one feature of the National Health Service, he said, which gave rise to anxiety in the minds of obstetricians—namely, the division of responsibility between regional hospital boards and local health authorities, which, it was feared, might work to the disadvantage of the maternity service as a whole. In practice, he believed, this dichotomy would be bridged. A very fine team of people were now responsible for maternity services. Mr. Bevan also gave the provisional vital statistics for 1948—a maternal mortality rate of 1.01, compared with 3.13 in 1939; stillbirths 23.1, compared with 38.0; neonatal deaths 19.7, compared with 28.3; and infant mortality 34, compared with 50.6.

Modern Caesarean Section

Mr. C. MCINTOSH MARSHALL (Liverpool) introduced this subject by bringing forward statistics from 19 large hospitals in various parts of the country covering the period 1943 to 1947. The total number of deliveries at these hospitals was 125,179, and caesarean section had been carried out in 7,762 cases (6.2%). There had been 77 maternal deaths (0.99%) among these cases of caesarean section. The lower-segment operation was performed in 5,851 cases, with 35 deaths, and the classical operation in 1,734 cases, with 38 deaths. From these figures the classical operation came out three times worse than the lower-segment operation. "In my paper I speak of the classical operation with restraint and sadness; in public I never speak of it at all." Mr. Marshall recalled that in 1921, at the annual meeting of the British Medical Association at Newcastle, Professor Munro Kerr and Mr. Eardley Holland brought forward a similar collection of cases, covering the years 1911–20, and he compared this earlier series with that of 1943–7. In Kerr and Holland's collection were 1,218 cases of "favourable omen" (patient not in labour) with 19 deaths (1.56%); in the series now presented there were 3,126 such cases, with six deaths (0.19%). In the group of contracted pelvis and other cases (all cases being in labour), the maternal mortality in the earlier series was 4.41% and in the later series 0.96%. In the cases of eclampsia the figures were 32.1% and 7.69% respectively, in toxaemia 21.9% and 1.61%, and so with other indications or groups in which caesarean section had been performed.

They had all been more than half aware, said Mr. Marshall, that the scope and safety of caesarean section in this country had been steadily increasing over the last ten years or more. Now the evidence was seen, and the extent of the success could be measured. It would be a pity, however, if they allowed themselves to rest there. The problems to-day were different but just as great as those of thirty years ago. The ideal antibiotic would be discovered, and chemotherapy must still have many gifts in store. Anaesthetic practices would be even more streamlined, though he could not conceive that any method which produced unconsciousness would be without risk. In theory the answers to thrombosis and embolism had been found. And all the time a more thoughtful devotion to their art would lead, more surely than any other thing, to a lessening of maternal mortality in any one of its aspects—and, above all, in caesarean section.

This introduction led to a lively discussion and an almost astronomical multiplication of statistics. Dr. NINIAN FALKINER (Dublin) brought forward figures from the Rotunda extending over seven years: vaginal deliveries were 34,489 and abdominal deliveries 841—the number of deaths following the former being 56 and the latter 15. The same advantage of the lower-segment operation over the classical came out in these figures as in Mr. Marshall's. Mr. A. W. PURDIE (London) described an investigation covering Middlesex county hospitals over the period 1943–7. There had been 1,667 caesarean sections performed, with 23 maternal deaths (1.38%). The total deliveries numbered 51,562. In the cases of "favourable omen" the lower-segment operation was performed 410 times, with four maternal deaths, and the classical 116 times, with one death. Mr. Purdie hoped that the Congress would not be followed by a spate of unnecessary and ill-judged caesarean sections.

"Failed Forceps" Cases

Mr. FRANK STABLER (Newcastle) said that at the Princess Mary Maternity Hospital the policy had been consistently pursued of not refusing section to septic cases, however bad the state of the patient before operation. For many years they were isolated in this practice, but now with improvements in technique and the advance of chemotherapy there was a sway towards their opinion; but they had not been wrong even before the sulphonamides and penicillin. He gave an analysis of his "failed forceps" cases since 1925. In 23 years his department had performed caesarean section on 144 women who had previously undergone attempted forceps extraction. There were 23 deaths (15.9%). Since the employment of sulphonamides in 1936 there had been 61 lower-segment caesarean sections after failed forceps, with six deaths (10%). In the last 10 years, when blood transfusion had been freely available, there had been 33 cases, with one death. Penicillin had been available only for three years, so that it was impossible to show its effect, but it could be said that nowadays a mortality in the region of 5% might be expected. The incidence of "failed forceps" cases was dwindling every year. He did not advocate caesarean section for all "failed forceps" cases. It should be employed for cases of obstructed labour who would need it if there was no question of infection. In 307 cases of "failed forceps," 50 caesarean sections were done.

Dr. KEVIN FEENEY (Dublin) said that too many caesarean sections were being performed. Enthusiasm for this operation should be tempered by common sense. To use it as an easy way out of obstetric difficulty was unjustifiable. In any case it should be performed only by senior members of the staff. Professor DOUGAL BAIRD (Aberdeen) estimated that in 10 years' time there would be 150,000 women in Great Britain who had been the subject of caesarean section. What would be the effect on their future childbearing? On the long-term view they must look forward to the time when caesarean section would not be necessary at all. Contracted pelvis was disappearing among the generation now growing up. It should not be forgotten that childbirth was a natural process.

Professor MUNRO KERR paid tribute to earlier pioneers than Eardley Holland and himself, and said how proud he was to hear these latest figures.

Professor SUNDE (Oslo) said that during the past seven and a half years 600 caesarean sections had been performed at his University Hospital, with five deaths (0.8%). The credit for this low mortality should be given primarily to penicillin and sulphathiazole in cases of infection, heparin treatment of thrombosis and embolism, and the organization of blood banks. Cases of toxaemia were not subjected to caesarean section, and it was his opinion that eclampsia and accidental haemorrhage should as a rule be regarded as contraindications. In older primiparae—over 40—age alone was not considered sufficient indication. Only in complications such as weak pains, large foetus, or breech presentation was section considered. Dr. REX MATTERS (Adelaide) was surprised to learn of the high proportion of cases in which section was done. At the antipodes they did not expect so high a percentage. Dr. G. W. THEOBALD (Bradford) told the Congress of a dream: wishing to visit the gynaecology department, he found that it had been abolished, that menstruation had been completely controlled, that the period of gestation had been reduced to three months, and that all deliveries were by caesarean section, to facilitate which a zip-fastener had been invented! Another slightly satirical speech came from Dr. BETHEL SOLOMONS (Dublin), who suggested that the next Congress should include a first-rate discussion on normal labour.

Pregnanediol in the Urine

Professor G. F. MARRIAN (Edinburgh) opened a discussion on the methods of assay and clinical significance of pregnanediol in the urine. He said that it had been established that during the menstrual period this steroid was excreted in the urine only during the luteal phase; during pregnancy it was excreted in increasing amounts up to the time of delivery, and in women in whose ovaries there were no corpora lutea the injection of progesterone was followed by the appearance of pregnanediol in the urine. Quantitative investigations suggested, however, that the amounts of pregnanediol present in the urine during the luteal phase of the menstrual cycle and during pregnancy might not be quantitatively related to the total endogenous secretion of progesterone or to that fraction of the latter utilized in producing the physiological changes characteristic of the hormone. If that were so it would be difficult on theoretical grounds to justify the use of pregnanediol determinations for clinical purposes. But it would be premature to be dogmatic on the question, and the clinician should adopt a cautious attitude. There were grounds for hoping that pregnanediol determinations would ultimately prove to have a real, though limited, clinical value.

Dr. G. I. M. SWYER (University College Hospital), after examining the results of 860 pregnanediol assays, considered that in general such assays had little to offer the practising clinician. There were no solid grounds for believing that pregnanediol excretion reflected at all closely the progesterone levels of the blood, and undoubtedly the latter were of far greater physiological significance. A simple, direct means of assessing the blood progesterone would supply evidence of much more clinical value than could ever be expected from the pregnanediol excretion in the urine.

The subsequent discussion, in which several French and Swiss workers joined, took very much the same line. Dr. P. M. F. BISHOP (London) said that it had brought out three important points: (1) that pregnanediol assays were time-consuming procedures requiring expert supervision and technical assistance; (2) that they called for close co-operation and understanding between the ward or out-patient department and the laboratory; and (3) that they were of such limited clinical value that the first reaction must be one of disappointment. He considered also that the problems of what might be called medical gynaecology were becoming so numerous and complicated that there was a good deal to be said for referring them to a special department. There was already a tendency to separate the investigation and treatment of infertility from the work of the routine gynaecological out-patient clinic. Dr. A. C. CROOKE (Birmingham) also described this "laborious and somewhat insensitive method" as of very little clinical value in studying abnormalities of menstruation.

Essential Hypertension in Pregnancy

A well-sustained discussion on this subject was opened by Professor G. F. PICKERING (London), who said that there seemed strong grounds for the provisional opinion that essential hypertension was an inherited condition, probably on a simple Mendelian basis, but a more extended survey of the children of hypertensive parents was necessary before such a conclusion could be regarded as fully established. As for the mechanism of the condition, there was no doubt that the raised arteriolar pressure was the result of vascular narrowing, for the cardiac output and the blood viscosity had been measured accurately and found normal. This vascular narrowing was likely to be due to a chemical abnormality either of the blood or of the vessels themselves.

Professor F. J. BROWNE (London) discussed diagnosis, course, and treatment. He considered that with the exception of those cases in which renal function was diminished or in which there was albuminuric retinitis pregnancy might be allowed to continue. As danger to the foetus arose only when blood pressure was above 160 mm. Hg systolic, 100 diastolic, efforts should be made to keep it below that level, and for this purpose the best remedy at present was rest, which should be enjoined throughout pregnancy and its extent increased as pregnancy proceeded, especially after the twenty-fifth week. Sympathectomy was useful in carefully selected cases of hypertension, and was said to give better results if the diastolic pressure was high and the pulse pressure low. It was contraindicated if the kidneys were badly damaged or if there was coronary disease or marked arteriosclerosis. It should be considered if the outlook for a successful pregnancy was bad, and especially if previous pregnancies had been unsuccessful.

Among Professor Browne's conclusions were: (1) chronic hypertension contributed about 25% of all forms of toxaemia of late pregnancy; (2) if the blood pressure at the start of pregnancy was 150/100 or over, the outlook for a viable child was poor; (3) there was no evidence that the hypertension was permanently aggravated by the pregnancy unless the patient developed superimposed pre-eclamptic toxaemia or eclampsia; (4) as pre-eclamptic toxaemia developed in 60% of chronic hypertensive cases, and the risk of chronic hypertension following pre-eclamptic toxaemia was 50%, it followed that about one-third of all women with chronic hypertension who became pregnant had their hypertension permanently aggravated in some degree.

A Warning against "Mutilating Operations"

Mr. G. F. GIBBERD (London) hoped that obstetricians would be on guard against mutilating operations on the sympathetic nervous system. The field of routine midwifery must not be allowed to be invaded by "destructive surgery still in an experimental stage." On the clinical side they were concerned with three well-recognized conditions: essential hypertension, toxaemia of pregnancy, and chronic nephritis; but the more critical they were the more they would find the need for another group unclassifiable in the present state of knowledge. Increased knowledge in the future would come from the fuller study of the relatively few well-defined examples of the disease under discussion rather than from statistical surveys of large numbers of patients placed in arbitrary classes with no clinical significance.

Professor R. J. KELLAR (Edinburgh) summarized the position thus: in normal pregnancy there was an increase in the cardiac output and the blood volume, and an increased flow through the muscles of the forearm and through the skin of the hands at cool room temperatures. In essential hypertension complicating pregnancy the changes were of the same order, with the exception that the flow through the forearm muscles was somewhat increased. The paradox of an increased cardiac output, such as occurred so commonly both in normal and in hypertensive pregnancies, could be explained only by the presence of the highly vascular uterus and the choriodecidual space. Here, therefore, was an example of a positively beneficent effect of pregnancy on the hypertensive process, albeit, alas, a temporary one. Mr. G. J. SOPHIAN (London) said that they were still ignorant of what happened in the early stages of hypertension, but he personally felt that functional vascular spasm due to sympathetic overactivity was the primary factor, and that it resulted, if too severe and long-continued, in an anatomical change in which the muscular reactivity of the vessels was replaced by the relative irresponsiveness of fibro-elastic tissue.

Caesarean Section in Hypertension

Professor T. N. A. JEFFCOATE (Liverpool) brought back the discussion to the previous theme of caesarean section, this time with regard to its place in chronic hypertension and complicating albuminuria. He said frankly that much of the discussion on caesarean section at the Congress was not up to the standard to be expected in a gathering of that kind. Many platitudes had been stated without evidence to support them, and the impression which must have gone out was that the art and science of obstetrics consisted in birth by the natural passages at all costs—the "costs" being the death of the child and very often injury to the mother. It reminded him of what used to be said many years ago—that caesarean section was a confession of failure, the implication being that a dead child was a sign of success. Results which he was able to bring forward showed that by delivering babies by caesarean section—the cases chosen being the worst possible material (that is to say, those in which the disease was most intense)—figures

relating to the children could be produced practically as good as those of spontaneous delivery at term, and in the case of very small babies caesarean section offered the best of all prospects in chronic hypertension complicated by albuminuria.

Mr. DICKSON WRIGHT discussed hypertension from the operating surgeon's point of view, and after a number of others had taken part Professor F. J. BROWNE replied to Mr. Gibberd's remarks about "mutilating surgery."

Carcinoma of the Uterus

A long session of the Congress was devoted to modern concepts in the diagnosis, prognosis, and treatment of carcinoma of the uterus. Dr. J. ERNEST AYRE (Montreal) said the vaginal smear method, first put forward by Papanicolaou in 1928, was a simple means of detection, but the "surface biopsy" modification, by scraping an area of the cervix, was a more sensitive and accurate method of diagnosis in early cases of cancer. A negative "surface biopsy" scraping might be relied upon to indicate freedom from malignancy. Dr. GILBERT I. STRACHAN (Cardiff) described precancerous changes in the cervix on the basis of an investigation which had comprised the clinical examination of about 500 cases, including the histological examination of many hundreds of sections. He devoted special attention to one lesion of the cervix, namely, leucoplakia, which seemed to be the connecting link between the traumatized and infected cervix on the one hand and carcinoma on the other. Precancerous lesions were not observed at the growing edge of an established carcinoma, the probable reason being that when carcinomatous growth started it extended rapidly, blotting out any intermediate changes. The growing edge of an early carcinoma showed a sharp, sloping line of differentiation between the normal and the affected tissue.

Dr. A. GLUCKSMANN, of the Strangeways Research Laboratory, read a paper on prognosis based on biopsies. He found agreement between the early histological prognosis and five-year clinical results in 97% of cases, and held that suitably selected biopsies were reliable samples of the tumour and of its reaction to treatment. By the method he described patients with tumours curable by radiation methods could be selected for continued radiotherapy, while others were chosen for radical surgery.

Pelvic Exenteration

The Congress then listened to an exposition by Dr. ALEXANDER BRUNSCHWIG, of the Memorial Hospital, New York City, of his method of partial or complete exenteration for advanced uncontrolled cancers, principally of the cervix but also of the uterus and vulva, which he had been practising during the last two years. One type of operation consisted of complete excision of vagina, uterus, bladder, and pelvic lymph nodes, with bilateral implantation of the ureters into the pelvic colon; the other, of complete pelvic exenteration—excision of the bladder, vagina, and pelvic colon, together with the entire perineum, and implantation of both ureters into the colon above an end-colostomy. The partial pelvic exenteration had been done in 26 cases, with a surgical mortality of 19%. One patient had lived for 15 months and died of intercurrent disease, and others were living and well after a year or more. The complete pelvic exenteration had been carried out in 52 cases, with a surgical mortality of 23%, and seven patients were living and well after a period of from one year to 20 months. He defined surgical mortality as death occurring within a month of operation, whatever its cause.

Dr. JOE VINCENT MEIGS, of the Vincent Memorial Hospital, Boston, said that his group had done 35 similar operations, with about the same success as that reported by Dr. Brunschwig. It was the operation of choice in patients in whom radiation treatment had failed or who had fistula or recurrent tumours in the bladder or rectum, especially if they were in fair physical condition, as they so often were. Pictures were shown of these patients apparently, except for the inconvenience of a colostomy, living a normal life.

Mr. VICTOR BONNEY (London) said that some means should be found of distinguishing quite certainly the radiosensitive from the radio-resistant tumours before any treatment was decided. Professor VAN B. BASTIAANSE (Amsterdam) regretted that there had been no reference to the radical vaginal hysterectomy of Schauta. For the surgeon who had had experience in vaginal operations the Schauta operation was not difficult. Its primary mortality was low—only one death in about 250 cases at Amsterdam from 1942 to 1949—and the five-year cure rate was 55.34%. Professor MITRA (India) also drew attention to the many advantages of vaginal hysterectomy as compared with the abdominal approach.

Plea for Radiotherapy

Professor J. HEYMAN (Stockholm) took a different view. In the last six years the absolute cure rate at the Radiumhemmet had been 42% (the relative cure rate for Stage I being 70%, for Stage II, 42%, and for Stage III, 25%). They were very satisfied with the results of radiotherapy, and they had treated about 8,000 cases. He did not believe that there were any radio-resistant cases—there were cases which could not be cured by radiotherapy because they belonged to the group which was particularly malignant, but such cases could not be cured whatever the method used. If they had more extensive surgery it would mean a number of less competent surgeons at work, and they would not be likely to restrict themselves to the carefully selected case. Dr. MALCOLM DONALDSON urged the setting up by the Royal College of a Clinical Cancer Research Committee with an instruction to stimulate and co-ordinate mass investigations into the treatment of gynaecological cancer and to evaluate the results.

Maternal Mortality

Sir WILLIAM GILLIATT, president of the Royal College of Obstetricians and Gynaecologists, was applauded when he protested against the habit Ministers had of using maternal mortality statistics for political purposes. The Minister of Health in opening that Congress had spoken of the team work in the maternity service under the new Health Act and had then gone on to quote the figures, which were excellent in every way. But it might be suggested to the Minister that the National Health Service, which was 367 days old, could scarcely be responsible for the maternal mortality figures in 1948—at all events in the first half of that year. Sir William Gilliatt brought forward an analysis of maternal mortality in 1947 as compared with 1927. In 1927 the number of maternal deaths was 2,707, and in 1947 it was 1,058, a reduction of 61%. In the two groups of infections, post-abortional and puerperal, added together, the reduction had been as much as 82.75%. This he attributed to several factors: improvement in the planning of maternity units and the nursing of puerperal patients, the diminishing virulence of the streptococcus, the advent of the sulphonamides, the discovery of penicillin, and the better feeding of pregnant women. The reduction in mortality in the toxaemic group in 20 years had been 55.5%. Could this be carried further? During the past few years opinion had changed, and now not a low protein diet but a high one was advised, not only for normal pregnant women but also for those suffering from toxaemia, and the good results justified this striking change. In spite of official statistics, haemorrhage was the most common cause of maternal death. It was responsible directly for a large proportion of deaths in some of the other official groups. It was of the utmost importance to prevent unnecessary bleeding and to replace as soon as possible at least the amount of blood lost. He indicated the many ways in which unnecessary bleeding might be prevented.

Professor HILDA LLOYD (Birmingham) urged that normal confinements, after adequate and first-class antenatal care, should be conducted by midwives, whose training, it must be remembered, had been raised to a very high standard, far higher than that of the average newly qualified doctor who had had no further obstetric house appointments. The most urgent problem at the present time was an investigation into the aetiology, causation, and treatment of toxaemia, using the word in its broad sense.

Dr. PERCY STOCKS (Registrar-General's Office) said that about three-fifths of the fall in maternal sepsis between 1928–30 and 1947 could be attributed to the new drugs, the other two-fifths being due to improvements in antiseptic technique, including

the wearing of masks, and routine examination, and to greater antenatal care.

Midwifery and the General Practitioner

Sir EARDLEY HOLLAND, president of the Congress, said that very few individual obstetricians could get a real insight into the causation of maternal mortality, because they saw relatively so few deaths. He himself did not gain such an insight until at the beginning of the war it became one of his duties to investigate every maternal death in the home counties. He found the commonest cause to be shock or haemorrhage or both. Another generalization was that a high proportion of deaths were avoidable. He believed that in the home counties over three years at least half the maternal deaths would have been avoided by quite ordinary standards of midwifery.

Speaking of domiciliary practice, Sir Eardley Holland described the term "general-practitioner obstetrician" as an "absolute sham" and a misuse of the word "obstetrician." In America they had maternal mortality committees, and he thought such committees might be appointed here, consisting of clinical obstetricians and one or two specialists, to report on maternal deaths and analyse them, as was done in the American bi-monthly *Obstetrical and Gynecological Survey*.

Mr. G. W. THEOBALD (Bradford) said that owing to the dichotomy in the service some medical officers of health were persuading women who wanted to be attended by midwives to employ doctors, because if midwives were sent out the charge fell locally, whereas if the general practitioner went it fell on State funds. He believed that recent administrative developments had put back the clock of obstetric advance, though no doubt the blood transfusion service, the use of sulphonamides and penicillin, and so on, would mask the setback.

Dr. KOSMAK (New York) gave further details about the maternal mortality committees in the United States. Practically every large city now had one of these official juries investigating individual deaths. A great many confinements had been found to take place in so-called maternity homes which were poorly equipped, and in which the doctor was privileged to do anything he wanted, from induction of labour to caesarean section, though he might not be qualified to perform it. Through the Department of Health a set of rules and regulations had been drawn up which were in force at the present time and had proved to be of great value. Under these no general practitioner who undertook the care of a maternity case in one of these institutions was allowed to perform any major surgery without consultation. Among others who joined in this discussion were Dame LOUISE MCILROY, Professor DUGALD BAIRD, and Dr. H. R. MACLENNAN.

Sir WILLIAM GILLIATT said that he thought Sir Eardley Holland's suggestion for a committee to be appointed to investigate all maternal deaths was a good one, and that it might be transmitted to the Maternity and Midwifery Standing Advisory Committee recently constituted by the Minister, of which he was chairman.

Further Discussions

A short discussion on the management of pregnancy in diabetics was opened by Dr. WILFRID OAKLEY and Mr. JOHN PEEL (King's College Hospital) in a joint paper. They showed that the foetal mortality rate in the pre-diabetic state reached its maximum in the two-year period immediately preceding the onset of diabetes. The duration and severity of the maternal diabetes appeared to be unrelated to the high foetal mortality, but the degree of control was an important factor. Without proper control of diabetes a significant number of mothers died in diabetic coma, but with proper control the maternal mortality was influenced only very slightly if at all by the presence of the disease. The incidence of hydramnios was high in pregnancy in diabetic women, and that of toxaemia was greater than in non-diabetic women, the highest incidence being in the last three weeks. Reference was made to the high rate of neonatal death in babies born of diabetic mothers. The majority of the deaths occurred within 48 hours.

Dr. PETERSEN (Copenhagen) reported a study of 205 pregnancies in 152 diabetics in two lying-in hospitals in Denmark. He related the foetal mortality to the age of onset of diabetes in the mother. Thus with mothers in whom the diabetes had begun at age 1 to 15 the foetal mortality was 42%; with mothers who first had the disease between the ages of 16 and 24 the foetal mortality was 29%; and in those in whom diabetes did not appear before the age of 25 the foetal mortality was only 6%.

Doubt was cast upon the many statistics given in the course of this discussion when Professor F. J. BROWNE said that an expert statistician, looking at these figures, could "drive a horse and cart through them."

Hernia of the pouch of Douglas was the subject of another brief discussion, opened by Mr. C. D. READ (Chelsea Hospital for Women), and continued by Mr. VICTOR BONNEY, Dr. GREEN-ARMYTAGE, and others.

Throughout the Congress and at every session many members who wished to contribute to the discussions had to be denied owing to lack of time. Visits were paid to a number of hospitals, and at University College Hospital delegates were able to watch by means of television the operations performed in the theatre. This was done by means of Marconi portable television equipment. Two cameras, mounted in the gallery of the theatre, with their telephoto lenses trained on the operating table, recorded every phase of the operations, which were projected on the 20-in. screens of two Monitor receivers installed in a separate lecture hall.

Social occasions in connexion with the Congress included a banquet at Guildhall and a number of receptions. The next Congress will be held at Leeds in 1952.

COMMONWEALTH AND EMPIRE TUBERCULOSIS CONFERENCE

The second Commonwealth and Empire Health and Tuberculosis Conference, organized by the National Association for the Prevention of Tuberculosis, which is celebrating its fiftieth anniversary, was held at the Central Hall, Westminster, from July 5 to 8. It was attended by 1,200 medical and lay delegates and observers, 160 of whom came from overseas. Although pre-eminently a Commonwealth Conference, the United States, every country in Western Europe, and many foreign countries in Asia and Africa were represented. The discussions were on tuberculosis as a world problem, trends in modern treatment, tuberculosis schemes of local authorities and schemes in the Colonies, the prevention and the detection of the disease, and the psychological and social readaptation of the chronic sufferer. The conference was addressed by several members of the Government, including the Secretary of State for the Colonies, the Secretary of State for Commonwealth Relations, and the Parliamentary Secretary to the Ministry of Food. The Minister of Health sent a message in which he spoke of advances in the control of tuberculosis under the National Health Service. He referred to facilities for mass radiography, the availability of B.C.G. vaccination "within prudent and controlled limits," and the establishment as a statutory duty of the care and aftercare of tuberculous patients by local health authorities. Sir Robert Arthur Young presided over the first sessions of the conference.

Streptomycin

A discussion on trends in the modern treatment of tuberculosis turned largely upon streptomycin, on which several experts from other countries addressed the conference. Professor ETIENNE BERNARD, professor in the Faculty of Medicine, University of Paris, said that streptomycin had transformed the prognosis of miliary tuberculosis of the lungs. But there were two qualifications to be made. During the treatment of tuberculosis with streptomycin, or even after treatment, there sometimes appeared a suppurative cervical adenitis. No treatment was of any value, and in some of these cases, in spite of clearance of the lung fields, the patients died of cachexia. Organisms from the glandular pus showed streptomycin resistance. In other cases of acute miliary tuberculosis, after a complete

cure had apparently been effected a relapse occurred within six months or a year, with reappearance of miliary lesions in both lung fields and extra-pulmonary lesions. The relapses were severe; renewal of treatment was disappointing owing to streptomycin resistance, and some of the patients died in spite of the addition of para-aminosalicylic acid to the streptomycin. Clearing of the lung shadows did not therefore mean that the contest was definitely won, and the late danger of a relapse of miliary tuberculosis, with an unfavourable prognosis, must be borne in mind.

Dr. CECIL GORDON SHAVER, superintendent of the Niagara Peninsula Sanatorium Association, gave an account of the use of streptomycin in Canada. The drug became available to Canadian sanatoria early in 1947, but the cost at first was too high for its general use. In July, 1948, however, free distribution of streptomycin was made possible through federal health grants, and from then until the end of March 1,786 patients in Ontario sanatoria had received 1,950 free courses of treatment. Symptomatic improvement had been noted in practically every case, the main exceptions being those with fibro-cavernous disease. One point generally noted was that cases with fever showed a gradual subsidence of temperature unlike the usual course of tuberculous disease. Of seven adult cases of tuberculous meningitis good results were obtained in four cases but three showed relapses of varying severity. Of 13 cases of miliary tuberculosis 10 showed a good initial response, but six of these subsequently developed meningitis and died. In pulmonary tuberculosis exudative lesions had responded extremely well; in spreading disease, of 116 cases 75 (64%) showed improvement beyond ordinary expectations. In this group there had been five cases of relapse, leaving a total of 60% improved. In 27 cases there was no improvement, and in the remaining 14 the condition became worse under treatment.

After discussing the results in various tuberculous conditions Dr. Shaver said that most of the sanatoria were using a dose of one gramme daily for periods of 42 to 120 days. Investigation of the resistance of tubercle bacilli to streptomycin showed that resistance did not often develop before the end of six weeks; so that if a six-weeks course of treatment would produce the desired result, the drug should be discontinued at or before the end of that period. The Toronto Hospital at Weston reported that in the majority of cases in which streptomycin resistance appeared in the isolated organisms such resistance occurred from five to seven weeks after the beginning of treatment. In a few cases complete streptomycin resistance was not apparent at the conclusion of therapy, but showed itself a few months later. It was not possible as yet to state whether or not resistant bacilli might regain sensitivity.

British Experience of Modern Treatment

Dr. GEOFFREY MARSHALL (Brompton Hospital), after reciting the history of various treatments, some of which had been overrated and afterwards discarded, said that in streptomycin in the treatment of tuberculous meningitis they had something very different from what had gone before. He went on to describe the investigation of the value of streptomycin in pulmonary tuberculosis—an investigation under much more critical control than had ever been planned before in the case of a therapeutic remedy. The improvement under streptomycin was undoubted, but it was not lasting; most of the patients started to relapse during the latter part of the first six months of the trial.

Streptomycin was a valuable but a short-lived remedy. With the development of streptomycin-resistant strains, the preparation was no longer of value to the patient. The danger was that such patients might infect a younger person, who might contract a tuberculous meningitis which was streptomycin-resistant. A particular value of streptomycin was in the case of a patient who should have collapse therapy but was too ill to undergo it. For a limited time such a patient improved greatly under the drug, but the collapse therapy must be instituted within three months. Streptomycin could be used as an "umbrella" for surgery, but it was better to keep it in reserve; it was more effective as a remedy than as a preventive. The value of para-aminosalicylic acid was being tested. The Medical Research Council was conducting a rigid trial of PAS alone, streptomycin alone, and a combination of the two.

Mr. C. PRICE THOMAS (Westminster Hospital) described recent advances in thoracic surgery, particularly resection of the lung. There were some who thought that all patients should be subjected to resection, but this had its dangers, especially non-healing of the bronchus, the patients tending to get empyemas of the lung, and the disease spreading during the actual operative process. He agreed with Dr. Geoffrey Marshall that streptomycin had little power to prevent complications, but it was able to deal with them when they arrived. Operation could be done without streptomycin, but it was desirable that it be used as a cover; he started the administration of streptomycin one day before operation.

Professor J. LEHMANN (Gothenburg) said that chemotherapeutic agents could be considered only as an aid in the treatment of tuberculosis, and that all physical measures should still be used. Treatment with the present therapeutic agents was "only a faltering step in a long and stony way."

Collapse Therapy in Domiciliary Treatment

The increased demand for hospital and sanatorium beds and for more highly trained doctors and nurses consequent upon the newer treatments was emphasized by Dr. J. G. SCADDING (Institute of Diseases of the Chest, London). Streptomycin had greatly increased the average period required for institutional care—care, moreover, in a well-equipped and fully staffed institution. This applied alike to tuberculous meningitis, to miliary tuberculosis, and to pulmonary tuberculosis. One of the great advantages of streptomycin was that it enabled patients previously considered unsuitable for surgical treatment to undergo that treatment, but this needed trained teams and again prolonged the time necessary for institutional care.

The increased demand for beds as a result of these new measures, Dr. Scadding continued, had led to the use of collapse therapy as part of domiciliary treatment in suitable cases. Here he gave an account of work done along these lines in Southwark and in Hammersmith. At one clinic, out of some 90 new patients, roughly two-thirds were treated in their own homes by collapse therapy, with the result that it had been possible to cancel a number of applications for sanatorium accommodation. The scheme required careful co-operation between doctor, nurse, and social worker, but it seemed as if collapse therapy was likely to play an increasing part in the domiciliary treatment of pulmonary tuberculosis. Those engaged in this work had no doubt about the success of these measures, and the improvement in the morale of the patient was very evident. Such measures, however, must continue to be regarded as palliative only, and there should be no undue complacency following on their apparent success.

Dr. E. RIST (France) urged the advantages of artificial pneumothorax. Streptomycin and PAS were valuable, but they had their dangers and their failures. Pneumothorax on its introduction was hailed as the greatest advance ever made, but afterwards it underwent an unjustified decline in favour. He was surprised to find some colleagues preferring thoracoplasty and to read in American literature that many physicians preferred long bed rest to the institution of an artificial pneumothorax. After long experience he could affirm that the results obtained after collapse were more permanent than after bed rest only.

Para-aminosalicylic Acid

Dr. G. BIRATH (Sweden) mentioned the clinical advantages of PAS. An investigation of 150 to 200 cases had been made by the Swedish National Tuberculosis Association, and the results showed a significant difference in every respect, even radiologically, in favour of the PAS-treated cases. The effect was not so rapid as that of streptomycin, although a striking improvement might occur during the first six weeks of treatment. One of the main indications in toxic cases was to employ thoracoplasty, maintaining the patient on PAS throughout; the fever disappeared and the patient gained weight. The development of resistant micro-organisms seemed very rare.

Dr. E. K. PRITCHARD (Southwark) said that Dr. Toussaint, who originated collapse therapy in domiciliary treatment in Southwark, had since left that neighbourhood and he himself had continued to treat tuberculous patients in their homes. During the first eighteen months over 100 cases had been treated, and 31% were now sputum-free; 10% of these patients had died, but in a number of them the disease was fairly advanced before they came into his hands. About half were treated with pneumoperitoneum and half with pneumothorax; the former, he thought, should be the initial measure in the patient's home, except in very light and early cases. Any hope of doing good work in domiciliary treatment depended to a very large extent upon the keenness and efficiency of the health visitor. It was her business to get the patients into the right frame of mind, and to look in on them at odd times and make sure they were resting. PAS had a place in domiciliary treatment, and he had used it in a number of cases.

The long discussion was summed up by Dr. G. S. TODD (King Edward VII Sanatorium, Midhurst), who paid a special tribute to matrons and nurses. Modern treatment would be useless unless there was a competent team. The doctor might see the patient for five minutes every day, but the nurses saw him for hours and had to carry out many onerous duties.

Tuberculosis a World Problem

Another session of the conference was devoted to the consideration of tuberculosis as a world problem. It was opened by Dr. J. E. PERKINS (National Tuberculosis Association, U.S.A.). Dr. Perkins said that in the United States the death rate from tuberculosis was only 30 per 100,000, but tuberculosis was still a leading cause of death in the critically important age groups 15–34. In India the mortality was five times as high as in the United States, and in China even higher; in Asia as a whole the death rate was estimated by the World Health Organization to be between 260 and 360 per 100,000. The first WHO Assembly recognized the magnitude of the problem by giving it top priority for action by the secretariat, but the amount set aside to finance the work was pitifully small.

After speaking of the continuing need for voluntary organizations he pleaded for a clear understanding between these and the World Health Organization. The International Union against Tuberculosis, which gave invaluable service in the past in stimulating the exchange of scientific information through periodical international conferences and in other ways, went into hibernation during the war, but the stage was now set for its return.

A number of delegates then gave information about the position in their respective countries. Dr. C. J. W. BECKWITH (Canadian Tuberculosis Association) said that during the last twenty years the death rate from all forms of tuberculosis in Canada had been reduced by about 50%. In 1926 it was 86.5 per 100,000, in 1947 it was 43.4. It was believed that with intelligent and balanced use of the various measures for control and treatment, including the increasing use of B.C.G. vaccination, this death rate and the morbidity figures could be reduced appreciably further. Sanatorium treatment was provided without charge by law in five provinces; five provinces had legislation for compulsory segregation, and all the provinces had schemes for the support of the family while the breadwinner received treatment.

Dr. FRANK RETIEF (Johannesburg) said that during 1947–8 over 25,000 new entrants to the mining industry from the native territories within the Union of South Africa were examined by miniature radiography, and the radiological findings debarred 199 of them from employment. The death rate from pulmonary tuberculosis in native labourers in the gold mines was 52 per 100,000; the European death rate in the Union was 32, one of the lowest in the world. Miss RUTH BRIDGES gave an account of a special investigation into the relatively high incidence of tuberculosis among nurses in New Zealand.

The Indian Subcontinent

Dr. RAM CHANDRA ADHIKARI (Bengal Tuberculosis Association) painted a sombre picture of tuberculosis in India, where, it was estimated, at least half a million people died of the disease every year and there were about 2½ million open cases in the country. The death rate from tuberculosis in Lucknow was 419 per 100,000, compared with 96 in London. His talk, he said, was unrelieved by any silver lining. But mass inoculation must be introduced at once, and it was a great relief to learn that the Government of India, in spite of so many preoccupations, had seriously taken up the task of manufacturing B.C.G. vaccine on a large scale.

Dr. RIAZ ALI SHAH (Pakistan) said that in his country there were fewer than 700 beds for tuberculosis and only seven clinics. A Pakistan National Tuberculosis Association had been started; doctors had been sent to India and to Scandinavia for training, and 100 tuberculosis beds had been added to the hospital at Karachi. Dr. G. RANAWAKE (Ceylon) said that in his country every public health officer was being trained to become a potential tuberculosis officer, particularly in relation to the families and contacts of sanatorium patients. Ceylon was endeavouring also to make the sanatorium part and parcel of the hospital, instead of allowing the tuberculous patient to be the "private property" of the tuberculosis specialist.

Dr. J. B. MCDOUGALL, secretary of the WHO Expert Committee on Tuberculosis, described how during the past two years the World Health Organization had accepted the responsibility for a world survey of tuberculosis. This summer a number of areas in Central and South America were under scrutiny by WHO consultants; the South-East Asia region, comprising India, Ceylon, Burma, Siam, and Afghanistan, was also being surveyed; and in the Eastern Mediterranean visits had been paid to Iran, Irak, Aden, Egypt, Transjordania, and other areas. Of all the factors entering into the spread of tuberculosis in most countries in the world the extent of infection and the low nutritional standards of the people were the two most naturally linked together. If there was no infection there was no tuberculosis, irrespective of the environmental standards of the community. The lower the nutritional and environmental standards and the greater the amount of infection the higher was the price to be paid in morbidity and mortality. Adequate nutrition was the most useful ally in this campaign, and without help from those directly responsible for world food supplies their efforts would be much less successful. The Expert Committee in its first report had said: "There can be no isolationism in the field of health. The fight against tuberculosis is not a national or racial problem; it is a task for the whole of humanity."

Regional and Local Tuberculosis Schemes

From world problems the congress turned to discuss regional, county, and county borough tuberculosis schemes. Sir WILSON JAMESON (Chief Medical Officer, Ministry of Health) said that organized efforts to deal with tuberculosis dated only from 1912, or, more correctly, 1921, when the duty of making provision for the care of tuberculous patients was placed upon county and county borough authorities. With some outstanding exceptions, this provision was inadequate. Tuberculosis was not a disease which could be taken care of by general provision; it required special arrangements for prevention, control, and treatment, and various bodies had a part to play in it. The roots of tuberculosis lay deep in the conditions which favoured infection—bad housing, unhealthy industrial conditions, infected milk, malnutrition, and poverty, and unless all authorities did their duty there was no end to the road. They were apt to refer complacently to the great decline in mortality during the last few years, but the decline started long before any special attack was made, and in 1948 there were still nearly 22,000 deaths from tuberculosis in England and Wales, most of them at ages when the people should have been making their greatest contribution to the well-being of the community; and in the colonial empire it was the most widespread killing disease. The problem could be tackled only on sound epidemiological lines, with the isolation of infected persons, early diagnosis, and the management of subclinical infections.

The details of a tuberculosis scheme, Sir Wilson Jameson continued, were not to be found in the National Health Service

Act—they were a matter for local administration. To regional hospital boards was entrusted the institutional and dispensary part of the scheme, and to local authorities the arrangements for prevention, care, and aftercare. On the family doctor rested the responsibility for the preliminary diagnosis. He was a little weary of hearing complaints of confusion. Was anyone satisfied by the old arrangements under which the care of the tuberculous was isolated from all other branches of medicine? Anyone desiring now to specialize must undergo an extensive training and be eligible for consultant status if he made the grade, and it was only right that his employer should be the regional hospital board. But the preventive and social aspects of tuberculosis were more important than the curative, and the specialist who did not concern himself with all three would be failing in his duty.

The medical officer of health was the person to see that the community was getting the facilities it required and to secure the integration of the various parts of the scheme, one of which was the control of sources of infection. It was only by good will and common sense that a good service could be provided. The introduction of a new Health Service brought a new opportunity. They had better weapons than before to help them to overcome difficulties. What was wanted was a united and determined effort, and he hoped that this conference, held on the fiftieth birthday of the National Association, would mark a turning-point in the fight.

Bridging the Gaps

Dr. J. GREENWOOD WILSON (Cardiff) mourned the passing of the Welsh National Memorial Association. The area physician of that body had acted in every respect like the tuberculosis officer, sitting with the medical officer of health on committees and working in close collaboration with the local authorities. The average waiting-list for admission of Cardiff patients to association institutions over a period of years was 72, and the average time of waiting two to four months. Now the average waiting-list was 158 and the time of waiting three to nine months. The national administration had been split up between 14 hospital management committees. There was an echo of the medical committee in the advisory committee for each region which made recommendations to the regional hospital board, but an advisory body was not as powerful as an executive. There was a certain amount of weakness in an organization which divorced responsibility for institutional accommodation for the tuberculous from responsibility for their individual care. Dr. Wilson went on to describe what had already been done in Cardiff, and pointed out how much an active local authority could do for the care of patients and their families.

Dr. A. B. WILLIAMSON (Leeds Regional Hospital Board) said that the schism created by the Act between the clinical and preventive aspects soon became apparent, and the Board had sought ways and means of bridging the gap. Among these were a system of cross-representation, conferences between representatives of the Board and eleven health authorities, and on the professional side the formation of a technical advisory panel. Councillor G. E. HARDMAN (Withington Hospital Management Committee) said that the Lancashire County Council tuberculosis service had been a model of its kind, and he could not conceal the regret he felt at the break-up of one of the outstanding tuberculosis schemes in the country. He was left with the impression that they were going back in tuberculosis—not going forward. Mr. WILLIAM HARVEY (Northern Ireland Tuberculosis Authority) gave an outline of the Northern Ireland scheme, which was working well.

Dr. W. E. R. SAUNDERS (South-East Metropolitan Regional Board) said that the tuberculosis schemes of counties and county boroughs before the appointed day varied greatly in adequacy and efficiency. The smaller authorities had difficulty in providing a satisfactory service. Some of the larger authorities had much more satisfactory schemes, but even the L.C.C. scheme had two defects: that diagnosis was carried out by a number of metropolitan borough dispensaries while institutional treatment was the function of the county council itself, and that the tuberculosis officers, although carrying out their tuberculosis duties with great efficiency, had obtained their appointments with a view to becoming eventually medical officers of health of their respective metropolitan boroughs.

A discussion of the organization of comprehensive tuberculosis schemes in the Colonies was opened by Dr. CHARLES WILCOCKS (Director, Bureau of Hygiene and Tropical Diseases, London). He referred to B.C.G., a subject which must inevitably be considered wherever the tuberculosis situation was serious. B.C.G. was now being administered on a very large scale, and special teams were being sent by the World Health Organization to tropical and other countries.

Dr. R. B. MACGREGOR (Malaya), Dr. K. C. YEO (Hong Kong), Dr. W. S. HAYNES (Kenya), Dr. L. G. EDDEY (British Guiana), and Dr. P. C. COSGROVE (Sierra Leone), with others, gave accounts of the conditions and facilities in their respective fields.

Tuberculosis among Nurses and Students

A special session devoted to this subject was opened by Dr. JOHN LUNDQUIST (Stockholm). He said that during the last fifteen years special dispensaries for students had been set up in four Swedish cities, subsidized by the State and by the National Association. Students were regularly examined by tuberculin tests, *x* rays, and estimation of sedimentation rates. At first only first-year students were examined, but now older ones were included. It was considered important to examine them annually on account of the risk of infection to which they were exposed. A much higher morbidity occurred among medical students than among students from other faculties. Their long period of training might contribute towards this. At the beginning of their training medical students reacted negatively to about the same extent as other students, but in contrast to these others they often reacted positively during the third year, which coincided with the completion of the course in pathology. Among nurses tuberculosis was perhaps more prevalent than in any other profession. The death rate was six times greater among hospital personnel than among, for example, domestic science students. The disease was usually pulmonary, occurred during the first three years, and was caused by inhalation, often starting with acute laryngitis.

Dr. G. J. WHERRETT (Canadian Tuberculosis Association) said that this subject had received a great deal of attention in Canada during the last 25 years. In protecting the nurse the first step would appear to be the adoption of a rational nursing technique. In many hospitals there was a very casual approach to the question of infection in tuberculosis wards. Four essential points were: (1) adequate instruction of the nurses and students, and also of the patients; (2) care of the person, with adequate washing facilities; (3) protective clothing; (4) routine examination of all members of staff. B.C.G. vaccination had been found to be safe and had been generally accepted. Miss NORA BURROWS (N.A.P.T. Sanatorium, Matrons' Section) indicated some simple methods of prevention which should be carried out in all hospitals.

Dr. E. R. LONG (Pennsylvania) referred to the greatly increased incidence of tuberculosis among medical students as compared with other classes. It looked, he said, as if something happened during the second year, and the finger of suspicion was pointed more and more at the pathology course.

The discussion was wound up by Dr. MARC DANIELS (Medical Research Council). He said that for some reason people were apt to talk of infection in this disease as a useful method of immunization. In many hospitals a lack of elementary precautions, such as would be viewed with horror in wards for other contagious diseases, was tolerated. He referred particularly to the lack of instruction to new nurses or domestics entering the tuberculosis wards for the first time. This did not apply, of course, to the best hospitals, but it applied to many of the others. Infection could often be prevented by the wearing of masks, but these were used in relatively few institutions. Another method of preventing the disease among hospital workers was by the detection and proper treatment of the early lesion. Among nurses and medical students unparalleled opportunities for the early diagnosis of tuberculosis were often missed. There were still too few routine medical examinations in this country, especially when compared with the United States and with France and Holland. He added that he hoped the introduction of B.C.G. would not give people a false sense

of security. The vaccine did not provide complete protection, and the methods of maintaining resistance and avoiding hazardous exposure should still be applied. Recent work had shown that the major part of tuberculous infection was avoidable by taking adequate precautions, without detracting from the quality of the service given by hospital staff.

Administration of B.C.G.

The effectiveness of B.C.G. vaccine was debated at another session. Dr. K. A. JENSEN (University of Copenhagen) said that nearly thirty years had passed since B.C.G. was first employed for the vaccination of human beings, and discussions about whether it did any good were still proceeding. Experimentally it was ascertained long ago that B.C.G. vaccination increased the resistance of the organism but gave no absolute immunity. It would be unreasonable to expect more, for the resistance of experimental animals did not come up to the level of human resistance. Nevertheless, it was possible to ascertain some fundamental rules to which he wanted to call attention once more.

In the non-immunized organism the individual tubercle bacillus produced no toxic effects. It was phagocyted by one of the macrophages, in which it multiplied unhampered during the pre-allergic phase. But, once the state of allergy appeared, the tubercle bacillus exerted a strong influence, to which the organism responded with an acute exudative inflammation. At this juncture there were numerous tubercle bacilli present at the site of invasion, and there followed abscess formation with caseation—a typical primary focus. In the abscess itself the tubercle bacilli might keep on multiplying, whereas bacilli situated in the non-necrotic part of the inflammatory process were destroyed or ceased to multiply. Once a necrotic focus had developed there was danger of its spread.

In the immunized organism an acute exudative inflammation developed rapidly, but as a rule the irritant effect was not strong enough to give rise to a central abscess. Consequently the few tubercle bacilli remained embedded in reactive tissue and did not multiply, so that there was only a slight risk, or none at all, of the spreading of the process by endogenous aspiration or by way of lymphatics or blood vessels. Before long the exudative inflammation turned into chronic inflammation with a tendency to heal. But in the allergic organism the few tubercle bacilli might remain alive for a long time, and if resistance was lowered might multiply afresh. This illustrated the fundamental difference between the infection in immunized and non-immunized experimental animals, and there could hardly be any doubt that this great difference at the start of an infection might decide its later course.

The available experimental and clinical records on the effect of B.C.G. vaccine were now so comprehensive and reliable that they might properly wonder whether to-day it was justifiable to omit B.C.G. vaccination because controls were lacking. It remained to be seen whether B.C.G. vaccination would prove effective in countries where people were living under bad conditions, where natural resistance had been reduced because of malnutrition, and where the risk of exposure was grave.

B.C.G. Vaccination in India

Dr. P. V. BENJAMIN (Tuberculosis Association of India) said that B.C.G. vaccination was started in 1948 in India, where 4,000 clinics were needed and half a million beds, and at present there were only about 105 clinics and 7,500 beds. Vaccination had been in use for many years for small sections of the population, and the results showed that it could reduce considerably the morbidity and mortality rates, but where this had been the case the standard of living had been better than in India as a whole.

Vaccination of a few thousand people here and there could not materially change the trend in a country like India. It was estimated that 100 million people needed vaccination—people who were negative reactors, mostly in age groups below 20. One team of workers, consisting of doctor and nurse or health visitor, with other staff, and a mobile van, could vaccinate 100,000 persons a year. With 200 such teams it would be possible to vaccinate the whole population in five years. The vaccine was now prepared at a laboratory under the control of the Government of India and was certified by a number of experts. Six teams, each consisting of a doctor and two nurses, were supplied from Denmark and were now working in different centres in India. It was hoped by the end of 1950 to have trained about 200 teams.

Professor ARVID WALLGREN (Stockholm) said that there was no doubt that the number of people with natural resistance was increasing; in an isolated population the proportion would be small, but in an older civilization which had been fighting the disease for centuries it would be high. The degree of resistance was not fixed; it altered during the individual's lifetime with differences of nutrition, standards of living, and age. With B.C.G. vaccination the immunity lasted for five or ten years or more. It had been shown to last at least three years in 90% of cases, and six years in 80% of those examined. When sensitivity disappeared, re-vaccination should be undertaken if the risk of exposure continued. The object of this artificial immunity was to compensate for low natural resistance, and it was therefore particularly suitable for infants and small children, children at puberty, and those whose resistance was low owing to heredity or environment.

In addition to the formal sessions, clinical demonstrations were arranged at the Brompton Hospital, and there were visits to the Papworth Village Settlement, St. Mary's Hospital, Carshalton, the British Legion Village at Maidstone, and to Midhurst and other sanatoria. On the social side the delegates were entertained at receptions by the Government, by the British Medical Association, by the Royal College of Physicians, by the High Commissioner for India, and by the Wellcome Historical Medical Museum.

PROGRESS IN TREATMENT OF RHEUMATIC DISORDERS

INTERNATIONAL CONGRESS OF RHEUMATOLOGY

[FROM A SPECIAL CORRESPONDENT]

The Seventh International Congress on Rheumatic Diseases was recently held in New York under the joint auspices of the International League against Rheumatism and the American Rheumatism Association. The opening session at the Waldorf-Astoria was attended by over a thousand people, including some 300 rheumatologists from other countries. Messages from President Truman and Governor Dewey were read by the President, Professor Richard Freyberg. The paper by Drs. Hench, Kendall, Slocumb, and Polley, confirming officially the dramatic results which had been produced in severe rheumatoid arthritis by means of "cortisone" (Kendall)—compound E acetate—received an ovation such as is seldom seen at medical meetings. The effects described by these workers were confirmed by the five leading physicians who had each been provided with 1 gramme of the substance for trial. A brief summary of some of the more outstanding of the hundred papers read can be given by permission of the Congress authorities, who are publishing the proceedings in one volume later in the year (W. B. Saunders and Co.).

In addition to formal papers, a somewhat novel method of presentation was provided by "panel" discussions. Each panel was under the chairmanship of a distinguished physician, who had chosen five colleagues. For an hour they discussed the particular subject which had been allotted to them on the basis of specific questions submitted by outside members of the Congress the day previously. The official banquet was attended by high Governmental and medical personages, and afterwards the Honorary Membership of the American Rheumatism Association was presented to, among others, Lord Horder, Drs. C. W. Buckley, W. S. C. Copeman, D. H. Collins, J. B. Burt, R. G. Gordon, G. D. Kersley, W. Tegner, and Professor L. S. P. Davidson.

Compound E

Drs. Hench, Kendall, and others reported that the adrenal cortical hormone 17-hydroxy-11-dehydrocorticosterone (compound E) had been administered to 16 patients with severe or

moderately severe rheumatoid arthritis. In each case improvement in clinical features and in sedimentation rates began to appear within a few days. When administration of the hormone was discontinued the disease generally relapsed promptly. Compound E has been given, with encouraging results, to three patients with acute rheumatic fever and to one patient with lupus erythematosus with polyarthritis. Essentially similar clinical results accompanied by various biochemical effects, including reduction of sedimentation rates, were obtained from the administration of the pituitary adrenocorticotropic hormone (ACTH) to four patients with rheumatoid arthritis.

The rarity of these compounds at present and in the immediate future, and the limited scope of the preliminary data (especially regarding prolonged administration), make inappropriate now the use of the term "treatment" except in an investigative sense. This paper was presented not as a clinico-therapeutic report but as a study of certain physiological effects which these new hormones exert on rheumatoid arthritis. To provide adequate controls the injections of the adrenal cortical hormone were in some cases preceded—in other cases replaced—by injections of a preparation of similar appearance, a suspension of cholesterol. The times when the control solution and the adrenal hormone were interchanged were unknown to the patients and were for five weeks unknown even to the three clinical workers who were evaluating the results. When injections of the control solution were first administered for a few days, no outstanding clinical or biochemical alterations occurred until these injections were replaced by injections of the hormone. Likewise, when the adrenal hormone was replaced by the control preparation articular and muscular symptoms recurred within a few days and sedimentation rates rose. The changes in the function of joints and muscles were also demonstrated by motion pictures taken before, during, and after the administration of the adrenal cortical or the pituitary adrenocorticotropic hormone.

After the Congress a few of the delegates visited the Mayo Clinic by invitation and were privileged to see a new series of cases of severe rheumatoid arthritis started on this compound. After only three days one stated that she was completely symptom-free, all objective tests being negative. At the end of a week all three appeared to be functionally normal and had remained so for several days after injections were stopped. The difficulty in synthesizing this substance, as well as the occasional occurrence of undesirable side-effects, however, ensure that it will not be available for anything but well-controlled experimental work for some time to come.

Pituitary-adrenal Function

Another paper of the highest importance dealt with the possible relationship of pituitary-adrenal function to rheumatoid arthritis. Its authors, Professor G. W. Thorn (of Harvard) and Drs. P. H. Forsham, J. E. Warren, and T. B. Bayles, reported that the pituitary adrenocorticotropic hormone (ACTH, Armour) in normal subjects and in patients with intact adrenals stimulates the secretion of electrolyte-regulating, carbohydrate-regulating, and androgenic adrenal steroids. A fall in the level of circulating eosinophils (direct determination) and an increase in the urinary excretion of uric acid represent sensitive indicators of the increased secretion of 11-oxy adrenal steroids. With the eosinophil change as a reflection of adrenal cortical function, patients with rheumatoid arthritis, rheumatic fever, and gout have been investigated by administering pituitary ACTH. The initial eosinophil level was found to provide a simple measure of adrenal cortical activity in selected instances. The response to ACTH is a semi-quantitative method of estimating the reserve capacity of the gland. Actions whereby adrenal steroids may modify the course of disease were discussed. Of particular interest is the fact that the pituitary-adrenal system serves as a link between the effect of psychological and emotional factors and measurable changes in metabolic processes.

Endocrines and Ageing of Tissues

Drs. Martin Silberberg and Ruth Silberberg spoke on the effect of endocrines on articular tissues and their relation to ageing processes. They reported that the growth processes and regressive changes occur spontaneously in the articular tissues of ageing mice. The changes manifest themselves in hyperplasia and hypertrophy as well as in destruction of the articular cartilage, outgrowth of bone, swelling or fibrinoid change of the interstitial substance of the ligaments, mucoid change or proliferation of the synovia, and fibrosis of the bone marrow. These age changes differ in different strains of mice; they are genetically determined as to their onset, incidence, and severity, and are controlled by endocrine secretions. Moreover, the course of these age changes may be influenced by nutritional factors. Administration of thyroid or sex hormones delays the time of appearance of the age changes in the articular tissues and decreases their incidence. Conversely, joint lesions can be produced in laboratory animals by the administration of anterior hypophyseal hormone or by removal of the sex glands. The changes thus produced are morphologically indistinguishable from those occurring spontaneously, although the former appear at an earlier age and are more frequent than the latter. Some data on the effects of certain nutritional factors on the articular tissues, in particular of a high fat diet, were integrated with the aforementioned findings. It seemed from the discussion which followed this paper that endocrine secretions may be involved not only in the pathogenesis of rheumatoid arthritis but also in certain types of degenerative joint disease.

New Work on Gout

Gout has been the subject of intensive study in the last few years, and there is now strong evidence of adrenocortical dysfunction as a controlling factor. An important paper was read by W. Q. Wolfson, R. Levine, C. Cohn, E. F. Rosenberg, H. D. Hunt, and H. S. Guterman, of Chicago, reporting their studies in this field. These seem to provide evidence for the existence of two types of adrenocortical dysfunction in gout.

1. In gout, biological androgen activity appears to be maintained by an abnormal male sex hormone which when metabolized contributes only slightly to urinary 17-ketosteroid excretion. Similar findings are not observed in non-gouty hyperuricaemia or in rheumatoid arthritis. This "gouty androgen" appears to originate in the adrenal cortex and to be secreted under the same conditions as normal androgen, and to be oestrogen-opposed. It appears probable that the normal sex differential in plasma urate concentration is controlled by normal androgen and that gouty hyperuricaemia is controlled by the "gouty androgen."

2. An acute relative adrenocortical hypofunction with respect to 11-oxysteroid production appears to provide the prodromal setting for the attack of acute gouty arthritis. This relative deficiency may result from endogenous cyclic metabolic changes, from increased peripheral demand for 11-oxysteroid due to certain varieties of stress, or from the withdrawal of adrenocorticotropin. Alterations in serum cholesterol concentration suggest that this prodromal relative deficiency of 11-oxysteroid secretion may be associated with increased production of other unidentified adrenal steroids. Spontaneous or induced increases in 11-oxysteroid production appear to tend to terminate the attack of acute gouty arthritis.

It appears reasonable to assume that production of an abnormal androgen by the adrenal and the deficient response of the gland to increased demand for 11-oxysteroid are not independent defects but two aspects of a single underlying metabolic disturbance in gout.

Another important paper amplifying and extending these fundamental observations came from Ann Arbor University, Michigan—the role of the anterior pituitary and adrenal cortex in urate metabolism and in gout, by W. D. Robinson, W. Conn, D. Block, H. Louis, and J. Katz. These endocrine factors have been studied by observing (1) the effect of adrenocorticotropic hormone (ACTH) on urate metabolism in normal and gouty patients and on the course of acute gout; (2) 17-ketosteroid excretion in gouty patients; (3) the effects on metabolism and clinical gout produced by stimulating the anterior pituitary with epinephrine; and (4) the effect of colchicine on the pituitary-adrenocortical mechanism. In addition to blood and urine urate determinations by a specific enzymatic method other indices of pituitary-adrenocortical activity were followed.

ACTH produces a marked increase in urate excretion in normal individuals, without a significant fall in blood urate. The chief differences in a gouty patient given ACTH during

an asymptomatic period were a sharp decrease in true blood urate to less than 50% of the base-line levels and the absence of any evidence of rebound in pituitary-adrenocortical activity in the post-injection period; acute gout developed on the third post-injection day. Acute gout following tophectomy was not associated with any evident change in adrenocortical function. Injection of ACTH resulted in prompt temporary amelioration of symptoms on two occasions, and was followed by indications of adrenocortical stimulation. Epinephrine in doses of 1.5 mg. intravenously had no effect on acute gout. When it was given to an asymptomatic gout patient intravenously or intramuscularly in divided doses of 6 mg. daily, no metabolic effects were noted except a decrease in eosinophils. Twenty-six determinations of 17-ketosteroid excretion in 10 patients with gout gave values consistently lower than normal, during both attacks and interval periods. Colchicine in doses of 4 to 5 mg. orally and 2.0 mg. intravenously produced no change in eosinophil counts or nitrogen balance in patients with gout. Effects on blood and urine urate levels were inconsistent.

Tentative conclusions to date are (1) the adrenal cortex has a profound influence on urate metabolism; (2) its effect in gouty patients differs from that in normal subjects; (3) gout is characterized by a low excretion of 17-ketosteroids; (4) the adrenal cortex of gouty patients can respond to stimulation both during interval periods and at times of acute attacks. There is suggestive but not conclusive evidence that acute attacks tend to occur at times of decreased adrenocortical activity. Epinephrine appears to be an unsatisfactory method of stimulating pituitary-adrenocortical activity in gouty patients. The mode of action of colchicine through an endocrine mechanism has not yet been established.

Familial Gout

The familial aspects of gout were also reassessed in the light of modern knowledge by Professor J. H. Talbott. Gouty arthritis has long been identified as one of the diseases with a high familial incidence. Scudmore, in the first quarter of the nineteenth century, reported a paternal incidence of gout in 87% of patients who admitted a family history of this disease. Only recently, however, has the subject been studied as a genealogical problem with social and preventive implications. This has been possible in part because of the development of satisfactory methods for the determination of uric acid in serum. This in turn has permitted the accumulation of statistical data of the concentration of serum uric acid in the general population as well as in patients known to be suffering from gouty arthritis.

In the absence of certain obvious disturbances such as renal disease and leukaemia, etc., most non-gouty persons have a serum uric acid of less than 6 mg. per 100 ml., while gouty persons have a concentration above this level. The borderline between normal and gouty persons may be slightly lower in females than in males. Three series of gouty patients and non-affected relatives have been studied in recent years. These researches have been pursued in Ann Arbor, Cleveland, and Boston, respectively. The fourth series is now being investigated in Buffalo. The results are similar and the tentative conclusions significant. Approximately 25% of non-affected relatives of gouty patients have a hyperuricaemia when sampled at random ages. Presumably this percentage decreases in each decade of life, since an occasional non-affected relative with hyperuricaemia will develop gouty arthritis and will no longer be classified as a non-affected relative. The age at which hyperuricaemia appears has not been determined; possibly it is associated with puberty. The statistical evidence suggests that hyperuricaemia in gouty families is a single autosomal dominant gene. The mechanism whereby the dominant manifests itself is still uncertain. The strength of the dominant—i.e., the degree of elevation of serum uric acid—the duration of the metabolic dyscrasia, or an as yet unrecognized factor may each participate. As a problem in preventive medicine, or more appropriately anticipatory medicine, an enlightened approach to the care of gouty families would be the periodic examination of the serum of all relatives of gouty patients. These familial studies lend support to the hypothesis that the pathogenesis of gouty arthritis is related to an increased formation of uric acid by the body rather than to an impaired excretion.

Rheumatism a Social Problem

Dr. E. T. Conybeare, representing the British Ministry of Health, outlined the system on which it is proposed to tackle the problem of the rheumatic diseases under the National Health Service. He pointed out that the present reluctance of the medical staffs of a majority of the English teaching hospitals, and in particular of their specialist physicians, to accept rheumatology as a diagnostic and therapeutic specialty of proved value to patients and students may be regarded as the chief administrative difficulty in developing better medical care for rheumatic patients under the British National Health Service. The reasons for this attitude were discussed and suggestions made for the solution of the problem thereby presented. It appeared that in America professors of medicine were prepared to take the subject and its problems much more seriously, and considerable advances in knowledge had resulted.

Lord Horder spoke on "Rheumatism—A National Problem," and outlined the plan drawn up by the Empire Rheumatism Council to combat it. The dimensions of this problem, he said, were considerable. In Great Britain a conservative estimate of the number of adult sufferers from rheumatic disease is more than one million—or 1 in 50 of the population. The economic damage in sick pay, lost wages, and cost of treatment among the insured workers alone is £17,000,000 per annum, and this accounts for only one-third of the total population. An over-all figure of £30,000,000 would be a cautious estimate. Only by national action can this national problem be adequately dealt with. Health authorities should encourage and subsidize two types of rheumatic centres. (1) A specialized centre at a teaching hospital for diagnosis and treatment of cases referred by local centres, hospitals, or doctors; for teaching home therapy; investigation of new therapeutic methods; postgraduate courses of instruction and research. (2) Local (peripheral) treatment centres for out-patients referred by doctors. The result of such a plan would be to divide rheumatic patients into these groups: (*a*) a large section which with a very brief period of institutional treatment and a sound course of education would be enabled to carry on chiefly by simple home treatment, but would be kept under supervision by periodic visits to a treatment centre or by visits of skilled social service workers; (*b*) another large section which could secure adequate treatment, without much disturbance of normal life, by attendance for the necessary term at a local treatment centre; and (*c*) a smaller but important section which calls for treatment in hospital, rehabilitation, or for attendance at specialized treatment centres.

There is implicit in this plan the existence of some authority which would have the power to approve rheumatism clinics which satisfied the requirements deemed essential.

Rheumatoid Arthritis

Professor L. S. P. Davidson reported the results of a recent controlled investigation into the aetiology of rheumatoid arthritis by the Empire Rheumatism Council. In many previous published reports the absence of a controlled investigation into the incidence of similar factors in persons not suffering from rheumatoid arthritis makes it difficult or impossible to determine the validity of the aetiological claims made. The Scientific Advisory Committee of the Empire Rheumatism Council, believing that a properly controlled investigation into the aetiology of rheumatoid arthritis might provide clues indicating the most profitable direction for future fundamental laboratory studies, decided to devise a special method of case recording for statistical analysis which it was hoped would enable an answer to be given to some 20 aetiological questions. Five hundred cases of rheumatoid arthritis of five years' duration or less, and 500 control persons not suffering from rheumatoid arthritis comparable in regard to age, sex, and civil status, have been investigated and recorded. These records have been examined by the Council's statisticians, and the information from this investigation was summarized and will shortly be published in book form.

Dr. Charles Short, of Boston, and his colleagues presented a paper on the factors associated with the onset of rheumatoid arthritis—a statistical study of 293 patients and controls. His findings appeared to be on the whole more clear-cut

than those of the Empire Rheumatism Council. The onset of rheumatoid arthritis was usually preceded by constitutional symptoms or precipitating factors or both. Of the former the validity of fatigue and anorexia as prodromal symptoms was established. Strain, either mental or physical, and acute infections most commonly preceded the onset of arthritis, with, less frequently, exposure to cold or dampness, surgical operations, trauma, and childbirth. His data suggest that prodromal constitutional symptoms may mark the real onset, and that so-called precipitating factors merely determine a more easily recognizable phase, with articular localization of the morbid process.

The histopathology of rheumatoid arthritis, especially in the extra-articular manifestations, was discussed in a paper by Drs. Gibson and Kersley. They pointed out that further observations on synovial histology have confirmed that in early cases, before development of the Ghormley focus, diffuse plasma-cell reaction is present. By appropriate staining intra-cytoplasmic bodies, similar to those seen in myeloma, have been demonstrated in plasma cells; they are probably of protein nature. They pointed out that the nodules of rheumatoid arthritis can be clearly distinguished from those arising in rheumatic fever, though the pathology may not be dissimilar.

Other studies on the histopathology of the neuromuscular system in rheumatoid arthritis by L. Morrison, P. Catoggio, and Walter Bauer, of Boston, showed that small paravascular foci of round cells were present in the interstitial tissue of the nerves and muscles; these foci were usually in the perineurium or perimysium. The sympathetic chain was similarly affected by cellular infiltrations not only along the course of the fibres but also within the capsules of the ganglia as well. About 75% of the nerves and 65% of the muscles presented these cellular accumulations. In the muscles foci were found, whether blocks were taken from extensors or flexors, from the belly or near the tendon, from close to or far from an involved joint, from atrophied or healthy muscle. And similarly in nerves, whether motor or sensory or mixed, lesions were widely distributed. There was not much relationship between the presence of cellular accumulations on the one hand and, on the other, clinical activity of the disease, the age of the patient, and the duration of the disease. In comparing these nodular foci of round cells with those found in other disease of the connective tissue group like lupus erythematosus disseminatus, dermatomyositis, and rheumatic heart disease, it was concluded that no distinguishing diagnostic differences could be relied upon on account of overlapping pictures in the various diseases.

Further studies were presented from Sweden, America, and Chili on the electrophoretic analysis of plasma proteins, the urinary excretion of amino-acids, and a differential sheep-cell agglutination test for rheumatoid arthritis. Dr. E. G. L. Bywaters reported a "palindromic" variant of rheumatoid arthritis, from which he concluded that the separation of cases of "palindromic rheumatism" from the main body of rheumatoid arthritis may be justified on prognostic and therapeutic grounds, but that from the nosologic point of view, until further information is available about the causation of this group of diseases, we should view this type of case as a variant from the main type of rheumatoid arthritis.

Gold and Copper

The Department of Medical Physics of California University (Dr. J. J. Bertrand *et al.*) reported on the distribution of radioactive gold in the blood of animals and man. They stated that relatively small amounts of gold are held by the blood cells, the white cells containing much more per unit weight than the red cells. Most of the gold is found to be in the plasma and in a form which is chemically bound to one or several of the plasma fractions. It has been repeatedly demonstrated that soon after the intravenous injection of gold sodium thiosulphate it is present in the plasma in a form that will not dialyse through a semi-permeable membrane. At the present time work is under way by which the one or more fractions of plasma proteins which contain the gold may be identified. Dr. L. Grauirer (New York) described successful results in 8 cases of rheumatoid arthritis where gold had failed, by means of post-partum plasma, administered over a period of a year. Drs. J. Forestier, A. Certonciny, and F. Jacqueline from an experience of over 300 cases consider the indications for injections of copper salts to be as follows: (*a*) early cases of rheumatoid arthritis, where the action is quicker than that of gold salts; (*b*) resistance to gold salts (dubious results); (*c*) intolerance to gold salts (favourable results); (*d*) psoriasis arthropatica, polyarticular synovitis with effusion, and certain forms of chronic polyarticular gout. In cases where gold is tolerated, however, this substance remains the better of the two.

Ankylosing Spondylitis

Drs. Roland Davidson and Koetz, of Stanford University, California, read an interesting paper on the effect of △ 5 pregnenolone on urinary 17-ketosteroid excretion and on the symptomatology of ankylosing spondylarthritis, with a note on the results of fractionation. They report that increased urinary excretion of 17-ketosteroids has been demonstrated in ankylosing spondylarthritis in both male and female patients, and is present in early cases with little demonstrable joint change as well as in those patients who have had the disease for many years and show the typical findings of the advanced case. △ 5 pregnenolone is a steroid having several actions not characteristic of other steroids. Its chemical composition makes it a logical process material to act as a precursor of many active steroids. When normal individuals are subjected to acute stress and fatigue adrenal cortical activity is accelerated and increased rates of 17-ketosteroid excretion are observed. Pregnenolone administered under such conditions lowers the 17-kestosteroid excretion, improves performance, and combats fatigue. This steroid has not previously, they believe, been used in disease states. Its general properties, freedom from toxicity, its ability to lower urinary 17-ketosteroid excretion and to combat fatigue suggested its possible value in spondylarthritis.

Two series of cases treated by deep *x*-ray therapy were then assessed. The Canadian workers D. C. Graham, A. A. Fletcher, and Wallace Graham reported that 60% of cases received some symptomatic benefit, but they could find no evidence that the underlying disease process is affected. Severe reactions were rare, but one case developed a fatal leukaemia. Drs. F. Foster and J. Gillespie, of Boston, on the other hand, considered that in some at least of their cases the disease process had been rendered inactive, and in 88% they claimed favourable effects —more particularly in those cases treated within ten years of onset.

An important contribution to our knowledge of the role of heredity in both spondylitis and rheumatoid arthritis (these entities tend to be confused in many American statistics) was made by Drs. Robert Stecher, W. Solomon, and R. Wolpan, of Cleveland. The heredity and familial incidence of rheumatoid arthritis and spondylitis was studied by comparing the family history of patients with rheumatoid arthritis and of spondylitis with each other and with the families of several control series. Rheumatoid arthritis occurred in the fathers, mothers, and sisters of rheumatoid arthritis patients in a significantly higher proportion than it did in the relatives of patients with spondylitis or in the controls. Spondylitis occurred in the brothers and sisters of spondylitis patients and of rheumatoid arthritis patients more than it did in any other group. The figures, which had been statistically analysed and shown to be significant, were striking.

Non-articular Rheumatism

Dr. Henrick Seyfforth, of Oslo, presented a paper on the disease picture presented by chronic overstrain of the skeletal system as the result of faulty posture, occupational stresses, etc., reviewing the whole field from the angle of industrial medicine.

Dr. W. S. C. Copeman illustrated his paper on "the relationship of fibro-fatty tissue changes to certain rheumatic syndromes" with a film-strip. He showed that a completely new pathological entity appears to underly certain of these conditions, which in essence consist of a periodical shift of body fluid accompanied by tension pain. This is probably

under endocrine control, and in its later stages may give rise to actual herniation of the affected fat tissue in certain locations. Dr. O. Steinbrocker, of New York, spoke on reflex dystrophy of the extremities, basing his remarks upon a study of 98 cases, some of which he had followed up for ten years. He considered that stellate ganglion block is the most rapid therapeutic measure in such cases.

The fashionable "psychogenic" conception of certain forms of rheumatism was discussed in four major papers, the most broadly based of which was that of Dr. W. Tegner. He reviewed the problem from the standpoint of general medicine. He said that, though fundamentally the syndrome is present without physical signs of organic disease, there are many reactions which can be elicited which are of help in establishing the diagnosis. Laboratory findings and radiological examination will assist in excluding organic disease. The nature of the sensations of which the patients complain is abstruse and of great interest. It is very personal to the individual patient. The value of physiotherapy, which is so often ordered, is open to debate. The response of patients to various forms of treatment may be so bizarre as to be of diagnostic significance. The disposal of these patients presents a real problem. They are a burden to the community. Their symptoms are of value to them and are not easily dispelled. Individual psychiatry is not normally possible or helpful. Experimental work on group therapy is being carried out.

Drs. A. Walters, Wallace Graham, and H. C. Slade, of Toronto, reported that as the result of a clinical study of cases of this type they conclude that fibrositis may be a mixed entity. Factors influencing this appear to include both peripheral physical faults and central psychological abnormalities. Dr. E. Weiss, of Philadelphia, stressed the unsuspected physical causes such as brucellosis and subacute rheumatic fever which may underly the diagnosis of fibrositis. He considers, however, that a similar picture can arise solely from mental causes, of which marital problems are the most common. Dr. A. Ludwig, of New York, reported a small group of similar cases in which psycho-analysis had demonstrated a characteristic personality structure.

In the pathological sections there were several papers of interest and importance. Those on various aspects of connective tissue pathology—the key to our basic understanding of the rheumatic diseases—were contributed by such authorities as Karl Meyer and Paul Klemperer (New York) and Marian Ropes (Boston). The role of enzymes in rheumatic disease, the histological and chemical changes in skeletal muscle in normal and rheumatic subjects (J. J. Bunim *et al.*), and some new work on cardiac changes induced by certain types of streptococcus (Homer F. Swift) all attracted considerable attention, as did Dr. Douglas Collins's paper on the range of pathological reactions which can be displayed by human synovial tissues—a contribution to the study of specific lesions in which he stressed the need for caution in comparing reactions in synovial and extra-articular tissues. Dr. L. Dienes, of Boston, put forward some further work on the possible relationship of pleuro-pneumonia-like organisms to articular disease. J. H. Kellgren's address on the peripheral genesis of pain, in which he put forward new work on the many different mechanisms involved, was also the object of much interest.

After the Congress

Subsequent to the Congress in New York a party of delegates attended the American Medical Association's Annual Meeting in Atlantic City, where they listened with interest to the denunciation of "socialized medicine" contained in the presidential address which was given before nearly 12,000 medical men and women. After this they were taken on a post-convention tour to some of the chief centres of rheumatic research work. They visited Philadelphia, where they were guests of the American College of Physicians, as also of the University. From there to Boston, where the Massachusetts General Hospital, Robert B. Brigham Hospital, and other famous institutions, including Harvard University, provided scientific sessions and entertainment. The Niagara Falls and the University of Buffalo were visited *en route* (by lake steamer) to Detroit and Ann Arbor University. Next came Chicago and a fascinating practical demonstration of the effects of adrenocortical steroids on both rheumatoid arthritis and gout. From Chicago to the Middle West, to Rochester, Minnesota, where the party were hospitably entertained for three days at the Mayo Clinic under the auspices of Drs. Hench and Kendall. Some delegates remained for another week to study further work in the Rheumatism Department while most of the party proceeded to Washington. Here the heat-wave began to "get down" even the tougher delegates, and the party returned to New York after two interesting days there. The proceedings were marred by the sudden death of the president of the Congress, Professor Ralph Pemberton, whose loss will be widely felt. Dr. Loring Swaim, of Boston, deputized for him throughout.

MATERNITY AND CHILD WELFARE CONFERENCE

Effects of Legislation on Mothers and Children

The annual conference of the National Association for Maternity and Child Welfare was held at Friends' House, London, from June 22 to 24. The general theme of the six sessions was the effects of recent social legislation on mothers and children.

The conference was opened by Dr. CHARLES HILL, Secretary of the British Medical Association, who suggested that the experts in the field of social welfare and legislation were confronted with certain dangers. They were tempted, when reading the recent report of the Royal Commission on Population, to speak of potential mothers as "women of child-bearing age," and to think of children as "contributions to a population policy, also as recipients of calories, as vehicles of infectious disease, as temporary possessors of tonsils, and as a form of biological life worthy of the deepest scientific study by those of reforming mind." He was sufficiently "impertinent" to present a purely parental point of view, and, undismayed by the collection of distinguished obstetricians, administrators, and educationists he saw in front of him, to plead for an emphasis on a field of responsibility which no others could assume—namely, the responsibility which must be placed fairly and squarely on the shoulders of parents.

There was a danger, said Dr. Hill, that there might be handed over to external authority something which belonged to the parent, a danger also that, in tackling the complexities of legislation and struggling with the intricacies of administration, the simplest lessons of all might be forgotten—namely, the need for bringing home to the people—what was the secret of any population policy—that there was far more satisfaction to be found in the humdrum rearing of a family than in all the external delights which civilization had imported into this modern age.

The General-Practitioner Obstetrician and the Midwife

In the first discussion, with Sir ALLEN DALEY presiding, the opener was Dr. E. K. MACDONALD, medical officer of health for Leicester. He discussed the problem arising out of Section 23 of the National Health Service Act—of the provision by local health authorities of a midwifery service. The problem was in the relationship of the general-practitioner obstetrician and the midwife. In theory there was everything to be said for the establishment of a class of general practitioners with special experience and knowledge of midwifery, who would stand at the side of the midwife ready to help when help was needed. But the Ministry's regulations were drawn so loosely and presupposed so low a minimal standard of service for quite good remuneration that at times the patient must suffer. Dr. Macdonald referred in particular to the requirement that the general-practitioner obstetrician must give a minimum of two antenatal examinations. Did anyone feel that this was adequate? The danger was that a few general-practitioner obstetricians might be content with this low standard and, feeling it to be adequate, might not permit the midwife to do antenatal work herself, while the more conscientious practitioners, who were, of course, in the majority, would themselves

carry out a complete service of antenatal care and again exclude the midwife, whose experience would suffer.

While he welcomed the genus general-practitioner obstetrician, he felt strongly that its numbers should be restricted to practitioners who had had real experience and special training in the specialty, and that the principle of the doctor undertaking the confinement so that he might retain the remainder of the family on his list should be forgotten. He added that in Leicester there were some 2,500 domiciliary births a year and 100 general practitioners—giving an average of 25 cases, among which there would be very few "abnormals." Sufficient experience to deal with a bad abnormality could not be gained by that method, and what he would prefer was only 20 general-practitioner obstetricians, who would do all the abnormal domiciliary midwifery in the city.

Dr. BARBARA BAILEY, who continued the discussion from the point of view of a general practitioner, said that the new maternity service had been the cause of some heartburning among doctors and midwives. The difficulty arose over the question of attendance at confinement. The patient usually wanted the doctor to be there when her baby was born, because, rightly or wrongly, the question of the doctor attending the confinement was wrapped up in the patient's mind with the relief of pain. The midwife, who should be, in the words of the Working Party's report, the "practitioner of normal midwifery," felt herself relegated permanently to the position of maternity nurse. The doctor was pulled all ways—by the patient who pressed him to attend her confinement whether necessary or not, by the knowledge that he was not intended to oust the midwife from delivering the normal case, and by the feeling that attendance at a certain number of normal confinements was absolutely necessary to maintain skill and clinical judgment. It was difficult to see how the balance could be struck and good feeling maintained between midwives and doctors; yet it was vitally important that there should be good feeling in the interests of the mothers and babies. It was her own practice to be present at the majority of the confinements of her National Health Service patients, to ask the midwife to deliver the baby and herself to be responsible for the analgesia and anaesthesia as required.

In Middlesex, out of 2,760 confinements occurring during the first nine months of the new Service, a doctor attended in 2,197 cases—an astonishingly high record. These figures showed that the doctors had set themselves a more exacting standard of work than the Act required. The statutory number of antenatal examinations was insufficient. Her own experience showed that eight antenatal examinations were made of each patient; she would regard it as a retrograde step if she saw a patient only twice during pregnancy. Yet that was all that was required by the terms of the Act.

Safeguards for Mother and Child

The Minister of Health was expected to address the final session of the conference, but his place was taken by Mr. A. BLENKINSOP, M.P., Parliamentary Secretary to the Ministry. Mr. Blenkinsop also devoted some part of his remarks to the maternity medical service. In this respect, he said, Scotland had for some time past been a pioneer in the use of doctors in domiciliary confinements. It was hoped to secure a further advance by ensuring that if a doctor was needed by a midwife at the time of the confinement he should be one already conversant with the case he was handling. This would be an additional safeguard both for mother and child. But it was certainly not intended to take away the midwife's feeling of responsibility. It was felt that there was a great opportunity for partnership between midwife and doctor for the benefit of mother and child. The clinic and the centre had a great part still to play, and here again it was certainly not desired to see any diminution of the vital work the clinics had to carry out. There was room for much voluntary work in antenatal supervision, advice on diet, and education for motherhood. The Ministry desired to see the most effective co-operation between doctor, midwife, clinic, and health visitor. This meant that there must be close liaison between the regional hospital boards, the local health authorities, and the executive councils. Mr. Blenkinsop concluded with some remarks on vaccination and immunization. The Ministry was concerned at the fall in the percentage of children vaccinated since the ending of compulsory vaccination. Recent events had underlined the importance of taking proper precautions early. With rapid modern transport there still might occur small outbreaks of smallpox which caused a great deal of worry and concern to large numbers of people.

In reply to a remark by a member of the audience that, while a great deal of lip-service was paid to maternity and child welfare, medical officers were being driven out of the service owing to the salaries offered, Mr. Blenkinsop said that he could not enter into a discussion on the salaries of medical officers of health. He gathered that the medical officers had put in a claim; he was afraid a great many other people were putting in claims at the moment.

Nova et Vetera

HISTORY OF A SPECIALTY

A History of Oto-Laryngology. By R. Scott Stevenson, M.D., F.R.C.S.Ed., and Douglas Guthrie, M.D., F.R.C.S.Ed. (Pp. 155; illustrated. 17s. 6d.) Edinburgh: E. and S. Livingstone. 1949.

The compilation of a history of even a small section of medicine entails a great deal of reading, with separation of the relevant from the irrelevant. In this discrimination the authors have fully succeeded, and they have reviewed references as far back as 3500 B.C.

It is clear that no real advances in the study of the ear, nose, and throat could take place until anatomy was taken seriously, as it was in the sixteenth century with the studies of Vesalius, Leonardo da Vinci, Eustachius, and Fallopius. The seventeenth and eighteenth centuries saw such important workers as Willis, who showed that the seventh nerve was different from the eighth; Valsalva, who observed fixation of the stapes in the oval window; and Scarpa, who described the saccule and utricle in 1789. All these discoveries were remarkable in the absence of modern aids to research. In the nineteenth century, when otology became a science, a galaxy of talented observers arose from all parts of the world. There was Helmholtz in 1862, with his "Sensations of Tone"; Flourens in 1830, and his work on the semicircular canals; Breuer in 1874, who noted that rotation caused movements of the head in animals and nystagmus in men; and that trio, Weber, Rinne, and Schwabach, whose names are still applied to tests to-day. Though a quack, Curtis made a fortune and founded what became the Royal Ear Hospital; he died in poverty.

After an account of these workers comes the story of James Yearsley, Toynbee, who was aural surgeon to St. Mary's Hospital (which has the distinction of being the first general hospital to allot beds to the specialty), and Sir William Wilde, of Dublin, There follows an interesting chapter on the education of the deaf down the years.

It is a matter of interest that laryngology did not progress at the pace of otology, but once established it went ahead rapidly. Though Garcia is hailed as the founder of laryngology (he saw his own cords by means of mirrors in 1855) it is satisfactory to read that Benjamin Guy Babington is credited with the invention of his "glottiscope" in 1829, though the authors throw doubt on his having seen the vocal cords. Physick, of Philadelphia, is named the father of American surgery; in 1820 he published an account of his method of removing tonsils by means of a snare, suggesting this was original. The modern sections are crowded with the names of well-known figures, many of whom will be known in person by readers.

This is a most readable volume of great interest to ear-nose-and-throat surgeons, and indeed to all those who enjoy medical history.

W. M. MOLLISON.

The *Daily Telegraph* (July 1) reports that Lloyd's underwriters will now insure anyone against contracting certain infectious diseases. This is a development of a scheme introduced during the epidemic of poliomyelitis in 1947.

ONE HUNDRED AND SEVENTEENTH ANNUAL MEETING

of the

British Medical Association

HARROGATE, JUNE 28 TO JULY 1, 1949

THE SECTIONS

SUMMARY OF PROCEEDINGS

In subsequent issues there will be printed in the BRITISH MEDICAL JOURNAL *a few of the opening papers read at the Scientific Sections. All the papers will be published in full in a separate volume of Proceedings. The reports of the discussions, concluded in this issue, are intended to give members who were not present a general idea of the proceedings.*

SECTION OF ANATOMY

Tuesday, June 28

Structure and Function of Muscle

With Professor JOHN KIRK (London), the president, in the chair, Professor W. T. ASTBURY (Leeds) opened the discussion on the structure and function of muscle by considering muscle as a molecular machine. Studies of muscle protein by *x*-ray diffraction analysis had shown that pure myosin had essentially the same structure as whole muscle itself, and that molecules of myosin were oriented in the direction of the myofibrils. Myosin seemed to be the seat of the contractile properties of muscle. Closely similar diffraction pictures were given by keratin of hair or wool, so that these molecules appeared to belong to the same family of elastic proteins. Recent work, too, had shown that the protein of bacterial flagella had a similar structure. The essential characteristic of all these proteins was that they could alter their molecular length and form. Even in the resting relaxed state they were in a folded configuration, but they could be pulled out into a more extended form or become more folded still. The molecules in india-rubber were somewhat different in that they were ordinarily coiled up in a complex manner, though they too could be pulled out into a chainlike form. The folding of hair and muscle protein was more regular than in the case of rubber. It was possible to make the protein of hair supercontractile so that a hair might contract to half its ordinary length. It would seem then that the basis of elasticity of hair, muscle, and india-rubber was essentially the same—a straightening out of already folded-up molecular chains with the resumption of the initial state when the extending force was removed. Professor Astbury showed electron photomicrographs of myofibrils which he had recently received from Draper and Hodge in Australia. Such work suggested that actual shortening of the contractile elements of the myofibril took place at the molecular level, and thus was not to be observed with the electron microscope but only by the indirect method of *x*-ray diffraction analysis.

Although myosin was now believed to be the actual substance which became shortened at the molecular level during muscular contraction, the work of Szent Györgyi and his colleagues had shown that there was another contractile protein present in muscle—"actin." That, too, could be prepared pure and studied by the electron microscope and by diffraction analysis. Actin could exist in a corpuscular form as a series of discrete rounded particles, and also assume a fibrous form by the joining together of these elementary bodies. This change was reversible, and could be brought about by alterations in the *p*H or salt concentration of the dispersion medium. The modern view was that myosin and actin worked together in the shortening of the myofibrils. The globular (corpuscular) form of actin became converted into the chainlike filamentous form, and contracted (i.e., more folded) molecules of myosin ranged themselves alongside these filaments.

Electron microscopy with the replica technique and the method of stripping successive layers developed in the Leeds school had shown that the cross striation of the myofibrils was real enough, though the surface of the fibril opposite striations was raised, which suggested differential changes during the dehydration necessary in preparing material for electron-microscope examination. In addition to the ordinary bands there were transverse striations some 400 Å apart which might be due to local accumulations of calcium and magnesium. These bands had been studied further by micro-incineration coupled with electron microscopy. Ordinary muscle striations were not essential for muscular contraction; they were not, for example, seen in plain muscle. Their appearance was associated with the need for speed of contraction. Striations might be depots of essential materials such as calcium or magnesium placed ready for use, as barrels of tar might be ranged along the side of a road under repair. Such stores might be used up if the muscle were worked too hard, and indeed an overworked muscle did show fuzziness and displacement of the striations. The flagella of *Proteus vulgaris* were made up of macromolecules; photographs indicated a structure similar to that of myosin. Flagella were probably macromolecular hairs—the simplest possible unit. Those flagella were thinner than the rods of the tobacco mosaic virus—probably about 120 Å against the latter's 150 Å.

Dr. R. BARER (Oxford) said that the sarcoplasm of muscle fibre would escape as a jet through a rupture in the sarcolemma, and the clear fragment of membrane remaining could then be examined with the electron microscope. Minute circular dots appeared on it, but their nature was unknown. The sarcolemma was less than 0.1μ thick. Very fine collagen fibres were closely adherent to the surface of the membrane and could readily give rise to mistaken ideas about the structure of the sarcolemma if examined by the progressive stripping technique of the Leeds workers. The sarcolemma had considerable elastic strength. The old idea of Kühne that sarcoplasm itself was contractile could not be entirely dismissed. There always remained the problem of how the nervous impulse brought in at the motor end-plate was disseminated to the myofibrils. Phase-contrast microscopy suggested that the incoming nerve fibre might lose itself in the granular sarcoplasm. The myofibrils were 1–2 μ in diameter. When a muscle fibre was treated with alkaline Ringer solution the myofibrillar contraction became asynchronous, and it was then possible to study the individual fibrils.

Professor W. E. LE GROS CLARK (Oxford) said that the experiences of the war had started an investigation into the vascular pattern of different muscles from the point of view of its influence on the prospects of regeneration or survival after injury. Each muscle seemed to have its own vascular pattern. Although it would seem possible that there might be anastomoses within the muscle, injection preparations suggested that was not the case, for the anastomoses were inadequate to carry on the nutrition of any devascularized area. The tibialis anterior muscle was supplied entirely from the anterior tibial artery and was therefore more susceptible to necrosis than extensor digitorum longus or extensor hallucis longus, which received branches from the posterior tibial artery also. In a second type of vascular supply a single branch entered a muscle or a muscle belly. That was seen in the two heads of the gastrocnemius muscle, where such single branches formed virtually the whole blood supply. On that account the muscle was susceptible to necrosis. Similarly, the biceps was also liable to have its blood supply interfered with, and a case of necrosis limited to that muscle was on record.

Individual branches within a muscle might anastomose, but such anastomosis might not be adequate for continued nutrition of the muscle. It was possible that in extensive incisions into muscles carried out at operation there might result more extensive necrosis than was commonly supposed. However, muscle was able to undergo considerable regeneration—

surprising amounts of regeneration in view of the commonly held view that muscle healed by scar tissue. By producing vascular lesions and examining the partially devascularized muscle at intervals after the operation he had shown that the necrotic area, which was found after two days, was invaded in about three weeks by streams of nucleated protoplasm growing down from the uninjured muscle fibres. It was astonishing to find that in the rabbit the greater part of the tibialis anterior muscle could be replaced in that way. The empty endomysial sheaths acted as guiding channels for the protoplasmic strands in much the same way as Schwann sheaths guided regenerating nerve fibres. It would appear that protoplasm might grow out with equal vigour from both ends of a muscle fibre. However, if scar tissue became interposed in the path of the outgrowing protoplasmic strands, then they became blocked and swelled up into pools, like neuromata. In one of Dr. F. K. Sanders's preparations of regenerating nerve, regenerating muscle fibres coursed down endoneural tubes. That would suggest that it was the mechanical action of the tubes acting as guides rather than any special chemotaxis which aided the regeneration of the muscle fibres. Possibly the areas of hyaline degeneration occurring in certain muscles in the course of such diseases as typhoid fever might disappear by regenerative processes such as those described.

Dr. R. E. M. BOWDEN (London) described the histological changes taking place in human voluntary muscle at intervals after peripheral nerve injury. After six weeks there was a certain looseness of the muscle fibres, which also had a tortuous appearance. Nuclei tended to become crowded together and the myofibrils were prominent. There was increase in fat and connective tissue, but there was no fat *within* muscle fibres, nor did there appear to be fibrous metaplasia of muscle tissue. Even 26 years after denervation there were still "ghosts" of muscle fibres to be seen. Motor end-plates could be recognized up to nine months after division of a peripheral motor nerve. Blood vessels in the muscle changed, the intima and media becoming thickened and perivascular leucocytic infiltrations appearing. In a favourable type of nerve injury with preserved Schwann tubes nerve fibres could be found struggling across fibrous tissue towards the original motor end-plates when regeneration was taking place, a finding in agreement with the experimental work of Young and Guttman on the possible regeneration of motor end-plates.

As to electromyographic changes shown by denervated human muscle, fibrillation action potentials began to appear 10 days to 4 weeks after denervation. Fibrillation potentials might make their appearance only on attempting voluntary movement. It seemed that the higher a nerve lesion the more rapid the rate of recovery—a finding in accordance with Young's theory of an axonic *vis a tergo* from the cell body being the basis of nerve-fibre regeneration.

Mr. W. F. FLOYD (London) said that fibrillation action potentials seemed to be the units of which ordinary activity was made up. The latter was due to random temporal distribution—i.e., an asynchronous firing-off of the individual motor units. It had to be remembered always that the electrical disturbance was over when the actual wave of muscular contraction took place. The introduction of the needle electrode into a muscle led to a burst of electrical activity—"insertion potentials"—ordinarily of very short duration, but in cases of myotonia atrophica it might last two seconds or more. Tapping a muscle also caused an outburst of electrical activity, which again was prolonged in myotonia. In that condition, too, gentle palpation of a muscle had the same effect. Characteristically, there was a persistence of action potentials after the cessation of stimulation, and that persistence might go on for three or four seconds. The phenomena were not made to disappear by curare. The disease could not, therefore, be one which affected the motor end-plate. It had been found than intravenous procaine modified greatly the myototic response of myotonic muscles.

In the discussion which followed cases were alluded to in which muscular spasm was unaccompanied by any electrical record. It was also pointed out that in the case of heart muscle the electrical manifestations did not necessarily parallel the degree of muscular contraction.

SECTION OF MEDICINE

Thursday, June 30

Streptomycin

With the vice-president, Professor H. W. FULLERTON (Aberdeen) in the chair, Dr. GEOFFREY MARSHALL (London) read a paper on streptomycin. In cases of tuberculous meningitis the drug had been given infrathecally and intramuscularly daily for one month, after which an interval of a week was allowed. This was followed by 48-hourly dosage, continued for at least three months and probably six months. As a result 30% of the children over the age of 3 had been cured; many had survived for a period, maimed either by deafness, blindness, or paresis, but most of these patients had died within a year. In only three cases had resistant strains of tubercle bacilli developed.

There had been fashions in the treatment of pulmonary tuberculosis. They had shown how difficult it was to assess results in this disease. Controls were necessary. It was decided to use streptomycin in patients between the ages of 15 and 30 in whom the disease was of not more than 12 months' duration and of exudative type, where cavitation was not the dominant feature, whose sputum was positive, and pyrexia was present. The cases and controls were selected by a statistician with the usual precautions. Some patients died during the period of observation and were therefore omitted from the series, which left 55 treated cases and 52 controls. The treatment lasted four months and was followed by two months' observation. As a result 69% of the treated cases were improved, against 33% of the controls. He emphasized how well some of the controls had done. They had become apyrexial and even put on a stone in weight. Of the treated patients 7% died during the period of observation, of the controls 27%.

There appeared to be two disadvantages: first, the development of resistant strains of tubercle bacilli, and secondly the effect of the drug on the vestibular mechanism of the body, producing ataxia. In non-tuberculous disease of the lung the drug was particularly effective against *Ps. pyocyanea,* but unfortunately resistance developed within a very short time.

Professor ROBERT CRUICKSHANK (London) said that using the drug had caused the development of more accurate methods for the demonstration of the tubercle bacillus and estimating its sensitivity to streptomycin. The examination of smears was inadequate, and culture had become essential. To achieve this it was necessary to render the sputum homogeneous and to kill other organisms that might be present. The usual method of doing this involved treatment with N/1 NaOH for 20–30 minutes at 37° C. But this was not very satisfactory, since many tubercle bacilli were killed with the other organisms. The method known as Jungmann's acid-iron-peroxide method was the best.

With regard to medium, if egg was used it should be made from fresh eggs and must be sown within three months. The du Boss medium, made with bovine albumin, which protected the tubercle bacillus, was most effective, and it could be made into a solid plate by the addition of agar. It might even render homogenization unnecessary, since penicillin and sulphonamides could be incorporated to prevent the growth of secondary organisms. He hoped that fungicides might also be added. A rapid test of sensitivity could be developed by sowing two plates, one as already described and the other containing streptomycin.

Strains that became highly resistant were in patients who had a poor tissue resistance and invariably did badly. The degree of resistance therefore could be used to some extent in assessing the prognosis. Low chloride in the cerebrospinal fluid was not of value in determining the early stage of meningitis, but on the other hand the sugar value was of great importance; in no case was it found above 50 mg. per 100 ml. In non-tuberculous disease the drug had been most effective in cases of *H. influenzae* meningitis, but all organisms became very rapidly resistant.

Dr. KENNETH PERRY (London) referred to the use of streptomycin in thoracoplasty. Started three days before the operation, it had not proved a very successful umbrella in

preventing spread of infection, though it was most effective in treating it. The optimum time for inducing an artificial pneumothorax for the purpose of closing cavities in the more acute case was three or four weeks after the start of streptomycin therapy.

Dr. MARSHALL, replying to questions, said that he considered the use of streptomycin in clear pleural effusion was wrong, since there was no method of determining which might subsequently develop pulmonary tuberculosis or indeed which were tuberculous; and, further, its use would be likely to produce resistant pulmonary disease. It was found to be not as effective when inhaled as when injected intramuscularly. It had not proved very effective in the treatment of pyothorax, though it was very good when the Semb space was infected.

Radioactive Substances

Dr. R. R. BOMFORD (London) then took the chair, and Dr. RUSSELL FRASER (London) read a paper on radioactive isotopes. These were most useful at present in physiology and experimental medicine, where they could be used for tagging substances either given by mouth or injected intravenously, so that they could be traced through the body. It must be remembered that the patient was given irradiation, and the proper protection was necessary. No patient was given more than 0.01 r in a day. This was quite safe; 25 r was given in a local exposure when a barium meal was performed. Some isotopes were more useful than others. Calcium could not be used, because of its long half-life; conversely, the rays of nitrogen were soft and its half-life was very short. Radioactive iodine was one of the best, since its half-life of eight days was not too long to be dangerous and not so short that it could not be measured.

Isotopes could be used in treatment. Many thyroid cancers did not concentrate iodine, but several did. In the latter radiation could be given to the right place in greater concentration than by any other method. Radioactive phosphorus was very effective in the treatment of chronic leukaemias and polycythaemia. Isotopes might also be given in insoluble materials for the local treatment of accessible carcinomata such as those of the breast.

In diagnosis radioactive iodine could be most useful in showing whether or not a retrosternal tumour concentrated iodine, and so whether or not it was a retrosternal goitre.

To aid the diagnosis of thyrotoxicosis and myxoedema the concentration of radioactive iodine might be measured in the gland itself, in plasma as the percentage of dose per litre, and in urine as the percentage of dose excreted. In the plasma the concentration was weak and therefore not easily measured. In the urine it could usefully be measured as the amount excreted over 48 hours or over different periods, such as 8–12 hours after the injection. In thyrotoxicosis the excretion curve fell rapidly and then flattened out, while the reverse was true in myxoedema. Broadly speaking, the less radioactive iodine in the urine specimen between 8 and 12 hours, the higher the basal metabolic rate.

Radioactive iodine might also be used in indicating the iodine content of histological material obtained from the thyroid gland. Contrary to what has been stated, there was no evidence that the pituitary concentrates iodine.

Anticoagulants

Professor H. W. FULLERTON (Aberdeen) then read a paper on anticoagulants. There was little doubt of the value of heparin in the prevention of arterial and venous thrombosis, but the expense of the drug and the necessity for giving it intravenously had confined its use to hospital. The clotting time should be kept at 30 minutes, and this was rarely attained by dosage less than 75–100 mg. every four hours. It was obtained by a continuous intravenous drip, and could therefore be used only for a few days. Dicoumarol, which can be given by mouth and which lowered the prothrombin concentration, was becoming more firmly established in the treatment of venous thrombosis and coronary infarction. The American Heart Association had recently compared the results of treating 386 patients with the latter disease by conventional methods with those of treating 432 patients with conventional therapy plus dicoumarol. Of the control group 24% died, whereas of the dicoumarol group only 14.9% died. Of the control group 25% had one or more thrombotic complications (secondary myocardial infarct; pulmonary, cerebral, or peripheral emboli; venous thrombosis), whereas only 12% of treated cases were so affected.

No uniform scheme of dosage can be applied, and each individual needed to be controlled by a regular estimation of the plasma prothrombin, otherwise there was great danger from haemorrhage. Plasma lipoid played an important part in coagulation which had not previously been recognized. While the venom-and-lecithin method was the most accurate for prothrombin estimation, the venom alone gave a more accurate method of estimating coagulability, which was much influenced by the amount of fat in the diet. In dicoumarol therapy, while the prothrombin in the blood was lowered the lipoid activator was increased. He therefore thought that the venom test was the best for controlling this therapy. He usually gave 350 mg. on the first day, 200 mg. on the next day, and then endeavoured to keep the accelerated clotting time by the venom test at 40 seconds. There were no definite rules about how this should be done; not only should the accelerating clotting time be noted but also the speed at which it was rising. When haemorrhage occurred it was frequently in the form of haematuria and was controlled by transfusion.

Professor A. P. THOMPSON (Birmingham) said that he had treated patients with heparin by intravenous drip with success, and he felt it was safer than dicoumarol. With this drug he had had two deaths: in one there was a suprarenal haemorrhage; many sub-pleural and sub-endothelial haemorrhages had been a feature at the necropsies.

Professor R. E. TUNBRIDGE (Leeds) recorded a case he had seen where a patient had died although the prothrombin time had been normal; the necropsy revealed many small endothelial haemorrhages and small haemorrhages in many organs.

Professor FULLERTON in reply agreed that heparin was much safer than dicoumarol, but it could not be given for the month or six weeks necessary for the treatment of coronary thrombosis.

SECTION OF PATHOLOGY AND BACTERIOLOGY

Thursday, June 30

Chemotherapy in the Treatment of Malignant Disease

The discussion on chemotherapy in the treatment of malignant disease was introduced by Professor E. C. DODDS (London), who pointed out the obstacles to a rational approach to this problem, since the cause of the disease was still unknown. A great variety of chemotherapeutic agents had been tried, and the most hopeful of these fell into two main groups: (1) substances inhibiting the growth of tumours indirectly by their effect on the host background, and (2) substances with a directly toxic action on malignant cells.

In the first group stilboestrol was the outstanding example, and had been used in the treatment of carcinoma of the prostate with remarkably successful results, although claims for complete cure could not be substantiated. In the second group of cytotoxic agents, of which urethane and the nitrogen mustards were examples, the margin between the therapeutically effective and the toxic dose was small. These substances acted directly on cancer cells.

A new approach had been made with the use of anti-folic-acid compounds which, since folic acid was an essential requirement for neoplastic growth, suppressed selectively the growth of tumour and leukaemic cells. Encouraging results had been obtained with these compounds in the treatment of spontaneous and transplanted tumours in animals, but more work was needed to assess their clinical value.

Professor A. HADDOW (London) restricted his remarks to one type of substance of chemotherapeutic interest with a direct action on the tumour cell. This was a new series of some 200 compounds, mainly aromatic nitrogen mustards or analogous substances. He was representing a team of workers that included G. A. R. Kon, W. C. J. Ross, P. C. Koller, A. Loveless,

E. S. Horning, and R. J. Goldacre. While it seemed not unreasonable to expect improved therapeutic efficiency from chemical modification of the aliphatic types so far employed, clinical trial of a few new types, especially the *bis*-chloroethyl derivative of β-naphthylamine, indicated that therapeutic effects were still largely confined to those tumour types—especially Hodgkin's disease—which were most responsive to the aliphatic chloroethylamines. The new aromatic substances had, however, some practical advantage in that they could be readily administered by mouth for considerable periods. Examples were shown of the clinical responses obtained, especially in Hodgkin's disease, chronic lymphatic leukaemia, and plasmocytoma.

That the action of such substances was largely a direct one on the cell was illustrated by cytological evidence—induction of nucleic-acid-deficient zones in the chromosome, chromosome breaks, defects of chromosome spiralization, anaphase bridges, and ejection of fragmented chromatin into the cytoplasm in the form of micronuclei. The significant effect was believed to be produced in the resting stage, with consequent damage to the mechanism of mitosis which became evident cytologically only in the course of cell division; such damage tended to augment in successive divisions until the cell was no longer viable.

Both the clinical responses and cytological effects induced by these substances clearly illustrated their radiometric character, and this was further seen in the damage which they inflicted upon cell division in the bone marrow and testis, and in the characteristic and permanent bleaching of pigmented hair in the areas overlying the site of subcutaneous injection: the last effect was quite indistinguishable from a similar effect produced by irradiation with *x* rays or the subcutaneous injection of plutonium.

Since *x* rays and other agents with similar growth-inhibitory properties were known to be carcinogenic, it became important to decide whether the new aromatic mustards were endowed with the same property. Extensive biological tests had now shown this to be so. Examples were shown of sarcomata induced at the site of subcutaneous injection, and there was evidence that these substances were also active by mouth and so might induce carcinomata in the intestinal tract. Many of the induced sarcomata were of exceptional interest on account of their high incidence of cytological abnormality, a feature which appeared to be characteristic and was maintained on transplantation over many generations. Professor Haddow went on to discuss the mode of action of these new chemically active substances on the cell and looked forward to the eventual prospect of correlating the chemical properties of a carcinogen with the chemical and genetic properties of particular chromosome regions. He concluded that the frontal attack on the chemotherapy of cancer was not likely to be the most successful, since workers were inevitably drawn back to questions of the mechanism of carcinogenesis, questions which were more fundamental and hence more fruitful in the long run.

Professor F. DICKENS (London) discussed the use of folic acid antagonists in experimental cancer therapy. Folic acid as a member of the B group of vitamins was essential for cell growth, being particularly concerned with haemopoiesis and probably with the synthesis of nucleic acids and related compounds. Actively growing cells, such as bone marrow and intestinal mucosa, had a special need for folic acid, which was also the vitamin present at the highest relative level in neoplasms. It therefore seemed logical to attempt the suppression of tumour growth by anti-folic-acid compounds such as aminopterin and anethopterin.

Professor Dickens and his colleagues had tested the effect of both folic acid derivatives and anti-folic acid substances in the treatment of mammary adenocarcinoma in mice. With the former group they failed to obtain inhibition or regression of tumour growth, but with anethopterin, given daily by intraperitoneal injections, only two of six mice tumours grew in the same way as in the control animals. Two tumours which had regressed started to grow again and two regressed completely. The treated animals showed pronounced leucopenia and haemoconcentration associated with diarrhoea. Larger groups of mice were now under test.

Sir STANFORD CADE (London) described his experience with both cytotoxic substances and hormones in the treatment of clinical cases. The nitrogen mustards had produced striking improvement in Hodgkin's disease and other reticuloses, and were particularly valuable in cases which had become resistant to *x* rays, but patients who relapsed usually failed to respond to a second course. Urethane was useful in chronic leukaemia, and had the advantage that the maintenance dose could be continued for years. Aminopterin, the anti-folic-acid compound, had been given in acute and chronic leukaemias (lymphatic, myelogenous and monocytic). It acted on both normal and abnormal blood cells and could reduce the total leucocyte count to very small numbers remarkably quickly, but the effect was only temporary.

Discussing the use of hormones, Sir Stanford Cade said that about 10% of prostatic cancers failed to respond to stilboestrol; a very large dosage had no advantages. He had employed both oestrogens and androgens in the treatment of mammary cancer; only oestrogens were effective in male mammary cancer, and in women they should not be given until ten or more years after the menopause. Testosterone was particularly effective against metastases in bone in female mammary cancer; by controlling tumour growth and allowing bone replacement it gave marked relief of symptoms. The tendency to masculinization was not related to dosage. There were no significant blood changes, although hypercalcaemia had been reported and there was an excessive excretion of 17-ketosteroids during treatment.

In the general discussion which followed, Professor R. J. V. PULVERTAFT, the president of the Section, pointed out the analogy between the events of carcinogenesis as described by Professor Haddow and the induction of adaptive modifications in bacteria. Professor HADDOW agreed, and stated that in fact many of the induced tumours had proved on test to be quite insensitive to the cytotoxic action of the compounds used to induce them.

SECTIONS OF SURGERY AND NEUROLOGY AND PSYCHIATRY

Thursday, June 30

Head Injury

With Mr. T. V. PEARCE (Harrogate) and Mr. W. R. HENDERSON (Leeds) presiding, Mr. G. F. ROWBOTHAM (Newcastle) opened a discussion, in the absence of Professor Norman Dott owing to illness, on the treatment, after-treatment, and sequelae of closed injuries to the head. Speaking of the diagnosis and management of the acute stage, he said that head injuries might provide difficult problems in diagnosis. Distortion of the brain was the essential lesion, and the whole brain was involved. Associated injuries must not be overlooked, and they might complicate the clinical picture; injuries to the cervical vertebrae were specially important. He distinguished between the intrinsic injury to the brain (contusion, laceration, diffuse neuronal injury) and the many complications which might develop. The intrinsic lesion might be overwhelming and cause death, but more attention to, and study of, the extrinsic complications should lead to lives being saved.

Careful supervision and nursing were required in the acute stage. Attention to feeding, bowels, bladder, skin, mouth, and eyes were specially important, while restlessness required treatment. It was difficult to know how often secondary complications occurred, or to visualize what was going on within the skull. Nevertheless, if they could control the complications they would save many lives. From studying post-mortem material he believed that even a thin layer of extra-dural blood could turn the scales and cause death. If consciousness was returning, operative interference was rarely required. Dehydration played no part in treatment. When there was grave doubt about the advisability of operation he advocated an exploratory trephine or "inspection hole" so that the site of possible intracranial haemorrhage could be looked at. He stressed the dangers of inadequate debridement of scalp wounds; this might lead to serious intracranial complications.

Dr. W. RITCHIE RUSSELL (Oxford) emphasized the difficulty at necropsy of knowing whether the visible abnormalities were in fact the cause of death. Most cases of head injury did well on "sheer neglect," but perhaps 20% required help with

rehabilitation. He advocated: (1) During the acute stage an environment of confident optimism, which prevented needless anxiety; (2) graduated physical exercises started early and pursued vigorously; (3) some form of advice service to which those patients could turn during convalescence.

A rehabilitation programme for the patient to attempt was helpful, and some competent person should be available to discuss matters fully with him. An early return to a few hours' work a day was specially valuable, but dangerous occupations might have to be given up for a time. Insistence on light work was often undesirable. Half a day spent at hard manual work might be much less tiring than a whole day at "light" work. An essential principle of rehabilitation was that the patient should practise those movements or activities which caused symptoms. For example, orthoptic exercises might be very helpful when reading led to blurring of vision or headache. Where disability was gross or the occupation specially dangerous the situation should be faced without delay, and if necessary a change of occupation advised. The head-injury advice bureau at Oxford had been valuable. Developments along those lines would be a useful form of preventive medicine.

Dr. E. STENGEL (London), speaking of the psychiatric aspects of head injury, said there was no phase following head injury in which the handling of the patient should not be guided by the psychiatric approach. The psychiatric approach was an attitude of mind which made one see an illness or accident as something that happened to a personality rather than to a part of the body. It also implied a distrust of uninformed common sense. They were less concerned than were their predecessors with separating the so-called functional from the organic features among the symptoms following head injuries, and aimed at stimulating the resources of the undamaged parts of the brain by rehabilitation and psychotherapy. Head injury was felt to be a psychic trauma much more than injury to almost any other part of the body. The head was the most significant part of the body image. Neurotic symptoms were apt to emerge when the ability of the personality to deal with the impact of emotional stress had suffered as the result of structural damage. He fully supported Dr. Ritchie Russell's proposal for the establishment of advice bureaux for those with head injuries, and thought that a psychiatrist versed in the problems concerned might be an asset on the staff of such a centre; he would also study the problem of accident proneness, which was part of a specific character structure.

In the discussion which followed, Mr. T. V. PEARCE said that he was surprised to find that the industrial insurance companies were not much impressed by the alleged difficulties in dealing with head injury cases. Dr. D. ENGEL described an increased permeability of the blood–brain barrier in the acute stage. Dr. HUGH GARLAND advocated care in what is said to the patient about fractures of the skull. Dr. GORDON CAMPBELL (San Francisco) referred to associated cervical lesions causing headache and even giddiness. Dr. J. G. GREENFIELD said that pontine lesions were rare, but the clinical picture in fatal cases often indicated a hypothalamic cause of death.

SECTION OF ANAESTHETICS

Thursday, June 30

Dental Anaesthesia

With Dr. H. B. WILSON (Aberdeen) in the chair, the discussion on dental anaesthesia was opened by Dr. W. S. MCCONNELL (London), who said that traditionally nitrous oxide was regarded as the safest and least harmful of anaesthetics. It was therefore administered regardless of its limitations, often with poor results. Its "safety" depended on the anaesthetic being abandoned at the whim of the anaesthetist and perhaps before completion of the operation. A physiological insult was offered to a patient by using a gas whose anaesthetic potency was so low that oxygen deprivation had to be used to augment its effect. He stressed the risks of so subduing a struggling patient. Nitrous oxide was contraindicated in children, who had a large oxygen demand and small vital capacity; in large muscular men—the "ageing athlete," who might be resistant when there was any psychological intolerance of general anaesthesia; and in patients who had a pre-existing lesion, such as respiratory obstruction, lung disease, myocardial disease, or anaemia, which made anoxia dangerous. The speaker always made a point of using a strap around the patient's pelvis.

A film was then shown of the technique of continuous nasal nitrous oxide, illustrating the difficulties and their management.

Dr. STEPHEN COFFIN (London) discussed the problem of anaesthetizing children for dental extractions in the chair. They were difficult patients because of a raised metabolic rate, nervousness, and the accentuation of mechanical difficulties by a small mouth. It was important that a child's first anaesthetic should not affect adversely his reaction to future ones. Dr. Coffin preferred nasal nitrous oxide and oxygen, because, though less easy than other methods, it allowed adequate working time and had the advantages of a pleasant induction and a rapid and uneventful recovery. Premedication was not given routinely except in the younger and more nervous patients. Troubles that might occur during maintenance were: difficulty in balancing good anaesthesia and colour, rapid cyanosis in response to oxygen limitation, and mechanical difficulties which reduced the airway. He stressed the prime necessity for a human and friendly approach to dental anaesthesia in children.

Mr. BALENDRA (Ceylon), speaking as a dental surgeon, pleaded for team work so that clumsiness on the part of the dental surgeon might not upset the anaesthesia. He had devised a strap which was part of an apron and was therefore not so objectionable to the patient. He also felt it was unwise to operate on patients who had trismus. In these patients cardiac or respiratory distress appeared suddenly on opening the mouth; they should be anaesthetized lying down.

Dr. A. H. GALLEY (London) drew attention to the value of trilene for children. He used it in the Oxford vinesthene inhaler. Dr. E. F. ADAMS (Birmingham) appealed for the modification of dental apparatus so that the gas mixture could be varied by means of a foot control.

Dr. J. MCAULEY (Blackpool) found a small dose of curare more helpful in the obstreperous patient than thiopentone. Curare with cyclopropane was best for elderly patients with cardiovascular disease. Drs. G. CATHERINE EVANS (Herne Bay), G. S. W. ORGANE (London), and R. P. HARBORD (Leeds) gave examples of their own methods, and described in particular how they gained the confidence of children about to undergo dental anaesthesia.

Continuous Caudal and Peridural Analgesia

With Dr. G. S. W. ORGANE (London) in the chair, Dr. ROBERT A. HINGSON (Baltimore) outlined the history of caudal and peridural analgesia from Sicard and Cathelin in 1901 to the present day, referring in particular to the work of Lundy and Cleland. He showed the instruments he used for continuous caudal analgesia, pointing out that the sacral hiatus was easy to enter and that there were no structures other than the last sacral and coccygeal nerves which were liable to injury. The latter in any case could be cut with impunity so far as the anal sphincter was concerned. A common technical error was injecting fluid or air outside the sacrum and traumatizing the periosteum of the sacral canal, with the production of pain. No standardization of dose was possible—each must be "tailor-made" to fit the individual patient. He had used continuous caudal block to remove the sympathetic vascular tone from the lower half of the body, producing a "bloodless phlebotomy" for those conditions in which a classical phlebotomy might have been undertaken. Pulmonary oedema and eclampsia were examples of conditions in which phlebotomy had been used to treat a vasomotor crisis, and for which caudal analgesia was equally successful.

Dr. Hingson then described the use of this method in the treatment of eclampsia and showed how the sympathetic block relieved hypertension, thus reducing the work of the heart and relieving oedema. Oxygen therapy must always be used concurrently. He demonstrated Tuohy's needle, which allowed a fine catheter to be inserted into the peridural or subarachnoid space in either a cephalic or caudal direction at the wish of

the administrator. Other successful uses of the method had been in cases of chronic ulceration of the legs, thrombophlebitis, and acute arterial thrombosis. In all these cases every safeguard, and particularly oxygen, was needed.

Dr. WINIFRED PITKIN (New York), the British-born widow of the late Dr. George Pitkin, reviewed the neuro-anatomy of the parts concerned in continuous caudal block.

Caudal Analgesia in Obstetrics

Later, at a joint meeting of the Sections of Anaesthetics and Obstetrics and Gynaecology, Dr. ROBERT A. HINGSON read a paper on continuous caudal analgesia in obstetrics. He first referred to ancillary factors which helped to make women in labour more comfortable, such as air-conditioning, artistic wall decorations, music, and television. The safeguards without which he considered caudal analgesia should not be undertaken were a continuous drip infusion and oxygen therapy.

The method was not without its disadvantages from the obstetric point of view, 40% of multiparae and 80% of primiparae needing forceps delivery. The obstetrician must be prepared for this or else he should reserve caudal analgesia for those cases where forceps were going to be applied in any case. He had now managed many thousands of cases with only two maternal deaths, one due to a massive spinal injection and the other to infection following penetration of the rectum. A total of 600,000 cases had now been reported. The extent of the anaesthesia had varied from the xiphoid cartilage to the toes, the duration from one hour to weeks. He advised that hospitals should arrange for teams of workers to cover the whole 24 hours, each team consisting of trained nurses and doctors who would look after the patient continuously. Many statistical and other charts were then shown illustrating how the method had reduced infant mortality, particularly among premature babies. Dr. Hingson again warned his listeners against the use of this method by untrained people and in unsuitable surroundings.

Dr. A. H. GALLEY (London), in opening the discussion, reviewed the anatomical pathways for both sensory and motor impulses connected with labour. He felt that continuous caudal analgesia was contraindicated in cases of placenta praevia, because the relaxed cervix ceased to give support to the placenta. The main indications were: multiparae, breech presentations, continuous contractions of the uterus with much pain, rigid cervix, foetal distress, prematurity, and where forceps delivery was anticipated. Professor R. R. MACINTOSH (Oxford) inquired how Dr. Hingson sterilized his catheters.

In reply Dr. HINGSON again referred to the possible dangers of the methods, saying that it could "assassinate women" if in improper hands or unsuitable circumstances. His catheters were all autoclaved. Formerly he used shellac-coated catheters, but had now found a new plastic material, "vinethyl," and which could be autoclaved. Another type of plastic catheter (polythene) would not stand up to heat but had to be sterilized in aqueous antiseptic. Continuous caudal analgesia carried with it an inherent mortality of about one in 20,000 women, because in one in 10,000 cases a peridural infection followed, and this condition carried with it a 50% mortality.

SECTION OF OCCUPATIONAL HEALTH

Thursday, June 30

Tuberculosis and Occupation

The chair was taken in turn by the vice-presidents, Dr. W. BLOOD (London), Professor G. P. CROWDEN (London), and Dr. F. S. COOKSEY (London). Dr. ALICE STEWART (Harrow-on-the-Hill) opened the discussion by describing an investigation into the incidence of pulmonary tuberculosis in the boot and shoe industry in Northamptonshire. It had been known for at least fifty years that the shoe trade carried a high mortality rate from phthisis. Investigation, based on the results of a mass radiography survey, on notified cases, and on the medical records of men called up, showed that this was partly due to selective recruitment. The shoe trade employed more men with quiescent tuberculosis than other trades. The physique of men was slightly subnormal, and there was a strong family tradition, so that workers were often interrelated. There was no evidence of a specific industrial hazard in boot and shoe factories, and the death rate for other diseases was below average.

The incidence of active tuberculosis was not uniformly distributed. Men and women employed in factories with large workshops contracted the disease more often than those in factories with small workrooms. The phthisis rate per 1,000 was 2.9 in rooms with fewer than 20 workers and 10.4 in those with over 80 workers per room. This same relationship between size of workroom and incidence had been found in the clothing industry. Further work would be necessary before it could be stated categorically that spread of infection was a fundamental cause of this high rate, but it might be an important factor in the epidemiology of other diseases.

Dr. W. POINTON DICK (Denham), discussing the advantages of mass radiography surveys in industry, said that 25% of those over 15 years old worked in factories. With the recent proposal that each worker should bring along a non-factory worker it would be possible to survey a substantial proportion of the adult population. Between 75 and 85% of the total population volunteered, and the degree of response was usually high where relations between management and workers were good. In return visits it was found that the rate of new cases per 100 examined was reduced by a third.

Dr. F. R. G. HEAF (London) said there were three important factors in the resettlement and rehabilitation of the tuberculous. First, it was never certain that a tuberculous person had recovered from his disability. Although there were few reliable figures in the follow-up of tuberculous cases, there was sufficient evidence to demonstrate a high relapse rate. Important factors in preventing relapse were high standards of housing and nutrition and routine medical examination at least once a year. The night sanatorium which offered care, nourishment, and rest had great possibilities in the future.

Secondly, it was not possible to assess the capacity for work of tuberculous persons except by trial and error. Certain occupations such as outdoor work, which was usually heavy, and high-pressure team-work were undesirable. Where possible the tuberculous should be specially trained so that their work had an economic value.

Thirdly, when the disease was active it was usually infectious, but it was probable that inherent resistance was the most important factor in infectivity, and that exogenous infection apart from the primary infection played a small part in causing active disease in those already infected. Financial assistance played a vital part in rehabilitation. This could sometimes be assured by contributions from certain authorities, but to apply a means test would do great harm.

Dr. E. H. CLUVER (S. Africa) said that in his country they were working on the assumption that the primary infection must be avoided. There would be extensive tuberculin testing of the African population from which gold-mining labourers were recruited. Those with a negative reaction would be given B.C.G. vaccine.

Dr. PETER EDWARDS (Market Drayton) said that many of the "incurables" could work and should be given a chance. Untutored idleness was bad for the tuberculous. Exogenous infection was an important factor in spread of the disease but could be controlled by proper sanatorium treatment. It was vitally important to educate the positive case, but a hard core of 10% were ineducable. At Papworth the value of education and sanatorium control was proved by the numbers of children and adults who had never become infected. Dr. BRIAN DAVEY (Oxford) made a plea for using mass radiography as an instrument for epidemiological research.

In reply Dr. HEAF said that tuberculin tests showed that a much higher percentage of the population in the lower age groups was escaping primary infection. B.C.G. vaccination could probably prevent the primary lesion from becoming dangerous. Later, infection by the exogenous route certainly took place, but it need not be harmful if the inherent resistance of the infected was high. Dr. ALICE STEWART suggested that it was easier to stop infection than to attempt to raise the resistance of the total population.

SECTION OF RHEUMATOLOGY

Thursday, June 30

International Congress at New York

Dr. G. D. KERSLEY (Bath) gave his impressions of the seventh International Congress on Rheumatic Diseases held in New York. Naturally, he said, discussions and clinical sessions tended to centre on endocrinology, so much so that Dr. Philip S. Hench coined the word "rheumocrinology" for this field. Much interest was also shown in the histology and microchemistry of connective tissue and their application to the "collagen diseases." Under this heading Professor Walter Bauer discussed rheumatic fever, rheumatoid disease, spondylitis, generalized lupus erythematosus, dermatomyositis, scleroderma, and polyarteritis nodosa.

These diseases had much in common, including a favourable reaction to "cortisone" (compound E), but Bauer advised that these syndromes should be kept separate until more was known of their specific aetiology. The widespread microdermal changes in rheumatoid disease were considered a non-specific response to some biochemical reaction, though they occurred much more frequently in this condition than in any other. Steiner (Detroit) alone maintained that the absence of reticulin network and the compactness of the focal lesions in rheumatoid disease allowed him to differentiate with certainty these lesions from those more rarely seen in other conditions.

The old difference of opinion about the interrelationship of ankylosing spondylitis and rheumatoid arthritis was maintained, the Americans considering the two conditions identical in spite of the different age and sex incidence, rarity of nodules and biopsy changes in the muscles in spondylitis, and their different reactions to gold and *x*-ray therapy.

In the field of orthopaedic surgery the outstanding pre- and post-operative care of cases undergoing cup arthroplasty for arthritis of the hip at Smith-Petersen's clinic at Boston was remarkable, the surgeon himself supervising all exercises during the early stages and rehabilitation being carried on for as long as two years. This operation was still being performed for spondylitic cases, but a second conservative operation was often indicated some eighteen months later. No walking was permitted without crutches for at least six months.

Excision of the heads of the metatarsals where there was pain and deformity was giving good results, and similar excisions of the acromial process, the head of the radius, and the lower end of the ulna were being carried out quite frequently when indicated.

A number of papers were read on the use of endocrines in rheumatic disease, notably by Hench and Kendall (Mayo Clinic), Thorne (Boston), and Woolfson (Chicago). Later a series of cases so treated were seen and examined. In addition to the Mayo Clinic, five other centres were given sufficient cortisone to treat two cases each for two weeks. Each centre confirmed the results obtained at the Mayo Clinic. The use of these hormones could not yet be looked upon as a new treatment likely to be available soon. Not only were supplies so limited that only research centres were likely to have any for some time, but the present cost of about £4,000 for two weeks' treatment was prohibitive. Much more needed to be learnt about actions and side-reactions.

"ACTH" (Armour), the corticotropic hormone of the anterior pituitary, and cortisone (Merck) (compound E acetate), 17-hydroxy-11-dehydrocorticosterone, a steroid from the adrenal cortex, had very similar properties, the former stimulating the adrenals to produce the latter. The dosage required, however, was so great that the contamination of ACTH with "pitressin" would often cause a rise in blood pressure, faintness, and vomiting.

Cortisone given intramuscularly in a dosage of 100 mg. a day produced a dramatic temporary remission in all the collagen diseases and also in gout, and was believed to be of benefit in treating such diverse conditions as metastatic carcinomatosis, hyperpiesis, and the shock of coronary thrombosis. Its action therefore was obviously a fundamental one, possibly on connective tissue, and not specific to rheumatic disease.

In rheumatoid arthritis some symptomatic improvement—relaxation in tension and easing of pain—began within a matter of hours. Within a week, pain largely disappeared, swelling was reduced, the appetite improved, weight was gained, anaemia was corrected, and the sedimentation rate began to drop. However, twenty-four hours after the cessation of treatment some falling off in the improvement was noticed, and often within a week the patient had relapsed, perhaps 80% of the improvement being lost. In rheumatic fever a similar result was obtained, but in only one case did a relapse occur immediately treatment was stopped.

Relief was experienced in attacks of gout within one to four hours, but about four days after the withdrawal of ACTH or cortisone, unless colchicine was administered in large doses, an acute attack occurred owing to the temporary production of a negative phase of corticosteroid production. This artificially produced attack was associated with all the usual chemical and clinical phenomena of gout and of 11-oxysteroid depression. This suggested that gouty individuals had a poor "stress" response from their anterior pituitary glands to shock, trauma, infection, or strain, and that this was the mechanism by which the trigger factors in gout acted.

Woolfson postulated that this sluggish corticosteroid response, together with an abnormal androgen, which was not a precursor of 17-ketosteroids and which helped to regulate a hereditary hyperuricaemia, explained the age, sex incidence, phases of gout, and the abnormally low 17-ketosteroid excretion in this disease. The latter was not due to difficulty in excretion, as testosterone administered to the gouty patient immediately produced a normal ketosteroid response.

In conclusion Dr. Kersley said it was impossible at the moment to define the significance of the recent discoveries in relation to the anterior pituitary and adrenal cortical hormones of the "carbohydrate" group or even their site of action. Their action must be fundamental rather than specific for rheumatic disease, though they affected beneficially all the collagen diseases and probably helped to explain the way in which the same triggers of shock, fatigue, infection, etc., adversely affected all these diseases. To produce results large doses had to be used, and this treatment could not be looked upon as simple replacement therapy, like insulin in diabetes or thyroid extract in myxoedema. He pointed to the absence of arthritis in Addison's disease. In certain diseases it might be that large doses of these steroids might act biochemically, as in the use of massive doses of vitamin C with arsenic, or the compounds may be catabolized over-rapidly in certain people. The only thing that was clear was that a new and wide field for research had been opened up with a reasonable hope of securing a valuable therapeutic weapon at some time in the future.

SECTION OF MEDICINE

Friday, July 1

Cirrhosis of the Liver

Professor R. E. TUNBRIDGE (Leeds), the president, took the chair, and Dr. N. H. MARTIN (London) opened a discussion on cirrhosis of the liver. He said that since Hanot described the condition 50 years ago the studies had been mainly of connective tissue, but what they really wanted to know was the condition of the liver cell. By means of liver biopsy it was possible to follow the changes from the acute phase to the stage of restoration as well as the chronic progressive disease, and it might thus be possible to discover how many recovered and how many subsequently broke down. However, it was only a small sample, and one only of the right lower lobe of the liver. Experimental evidence during exercise showed that there was a markedly diminished flow through the liver; if exercise were allowed too early during the recovery from acute hepatitis, the cells might be intermittently deprived of oxygen and thus permanently damaged. This might also explain the tendency to relapse.

In yellow fever there was little autolysis of the liver cells, and therefore there was rarely any fibrosis; whereas when the liver was poisoned by carbon tetrachloride there was marked autolysis, which he regarded as precirrhotic. It had long been known that carbohydrate had a protective action on the liver; but recently choline and methionine had been shown to

protect the liver from fatty infiltration. If sulphur-containing amino-acids, such as cystine, were cut out of the diet, small areas of haemorrhage and necrosis developed, while α-tocopherol (vitamin E) protected the whole liver when there was a deficiency of cystine and methionine. It was therefore most important not to starve the patient but to ensure an adequate protein intake.

Liver-function tests were disappointing. He usually used four: (1) Circulating bilirubin; (2) total plasma protein, and albumin–globulin ratio; (3) thymol turbidity; and (4) alkaline phosphatase. Steady deterioration shown by these tests indicated obstructive jaundice, whereas they showed gradual improvement in cases of acute hepatitis. The thymol turbidity test continued positive long after the serum bilirubin, urinary bilirubin, and urobilinogen had returned to normal levels. This test might be of value in prognosis, and those cases in which it was positive over a long period might be ones that would subsequently develop cirrhosis. With regard to plasma proteins, estimation of the total protein did not help very much, since it was very variable, but gross inversion of the albumin–globulin ratio was of significance.

Dr. M. H. K. HAGGIE (London) said that everyone had been taught that alcohol caused cirrhosis. He had therefore studied the notes of patients with evident cirrhosis who had come to necropsy at the London Hospital over a period of 40 years to ascertain how many gave a history of alcoholism, and had found that there had been a falling incidence in recent years.

	Alcoholics Per cent.	Teetotal Per cent.	Not Recorded in Notes Per cent.
1907–16 ..	50	31	19
1917–26 ..	33·3	33·4	33·3
1927–36 ..	29·7	46	24·3
1937–46 ..	13·6	54·5	31·8

He had also examined 19 patients with cirrhosis who had been in the hospital in the past two years. They had consisted of 12 women and 7 men, whereas in the old literature the incidence was three males to one female. This also indicated a changing cause. Two of the 19—one a barman and one a barmaid—were alcoholics. He therefore thought that alcohol was a factor in the cause of cirrhosis; but alcoholics often did not eat, and were therefore deficient in the necessary protective factors.

Mr. J. E. RICHARDSON (London) said that surgery was mostly concerned with the complications of cirrhosis—namely, haematemesis and ascites. It had been suggested in the past that portal hypertension might increase the liability of the gastric mucosa to ulcer formation and that gastrectomy was the right treatment; but in his experience a ruptured oesophageal varix was always found at necropsy. Further, if the lower end of the oesophagus was studied radiologically after swallowing barium the indentations of oesophageal varices could always be found in patients who had had recurrent haemorrhages. While ascites was often mechanical, it was sometimes also biochemical, and therefore a gross disturbance of the albumin–globulin ratio was an indication against surgery.

The main cause of post-operative deaths was oozing of blood, and therefore fresh blood should be used for transfusion, since stored blood was deficient in prothrombin and those patients also had a low prothrombin concentration in the blood. Many operations had been considered. Sclerosing fluid had been injected through an oesophagoscope into the varices; but the thrombosis might spread dangerously after that procedure, and it did not remove the cause of the varices. Splenectomy was dangerous because of the large number of vascular adhesions which had to be divided. Recently shunt operations had come into favour, such as anastomosing the splenic vein to the left renal vein, or the portal to the inferior vena cava. Anastomosis of the superior mesenteric to the inferior vena cava and of the inferior mesenteric to the left spermatic had also been performed. The spleno-renal was the easiest technically; it was possible that the porto-caval might eventually prove the best, since it gave the biggest shunt. The results were naturally somewhat better in cases of extrahepatic obstruction than in those of cirrhosis, but the operation carried a mortality rate as low as 10% and had given survival rates of 3½ years up to the present time without recurrence of the bleeding. In cases of ascites it had given survival of 18 months to the present time with no subsequent tapping.

Dr. E. R. CULLINAN (London) said that when Laënnec described cirrhosis 130 years ago he had referred to the golden-yellow colour of the liver; the name had been subsequently attached to sclerosis. He did not believe that acute hepatitis frequently progressed to cirrhosis. He was writing to one in five of the troops who developed hepatitis in the Middle East in 1942 and had had a very good reply; few of them had had subsequent trouble. He thought that patients with this disease needed rest for a considerable time after recovery and that it was vital to feed them to get a quick recovery. Extra rations, including meat and skimmed milk, were now available.

There was a difference between multiple nodular hyperplasia with recurring attacks of jaundice due to necrosis and subacute necrosis, which finally ended with cholaemia and death in jaundice and coma. The state was usually associated with cirrhosis. The first group never developed ascites. The latter condition was a very prolonged one. Early stages were quiet and produced few symptoms apart from attacks of gastro-enteritis, but eventually there were portal hypertension, oesophageal varices, splenomegaly, and ascites. The patients practically never gave a history of preceding jaundice.

Alcohol was a predisposing cause of cirrhosis; it was therefore important to recognize the early stages, since by stopping the patient's drinking it might be possible to prevent the development of portal hypertension. Those patients also often had anorexia, and it was important to get them to eat a full diet, generous in protein and carbohydrate and not restrictive in fats. Such a diet would certainly contain enough methionine. Vitamin-B complex should be given. The evidence in favour of giving androgens was equivocal. Bleeding might be the first sign of the disease, and accounted for 4% of cases of haematemesis; patients rarely lived two years after such an incident. Surgery therefore played an important part in prolonging life in those cases. Patients with ascites sometimes did well with a low-salt diet and mercurial diuretics, but rarely survived three paracenteses, which had the effect of hastening the onset of cholaemia, with confusion, semi-coma, and finally death. Porto-caval shunt therefore did offer some hope of prolonging life.

Dr. H. STEINITZ (Tel-Aviv, Israel) thought that the laevulose-tolerance test was of value and that a test of carbohydrate function should be included. Though they saw many kinds of liver damage in his country—particularly as a consequence of amoebiasis and infective hepatitis—true cirrhosis of the liver with portal hypertension, haematosis, and ascites was very rare. He did not know the cause, but there was almost no drunkenness in Israel or in the Arab population of Palestine.

Dr. R. R. BOMFORD (London) said that the theory that acute hepatitis led to portal cirrhosis was an attractive one but was without foundation. He asked whether every patient who had a palpable liver as his only abnormality should be regarded as an early case of cirrhosis. Dr. J. R. FORBES (Wrexham) said that one knew many people addicted to alcohol who never appeared to develop cirrhosis, and wondered whether there was a constitutional factor. Professor A. P. THOMSON (Birmingham) said that alcohol played a contributory part in the causation of cirrhosis. The poor in the past had had a diet deficient in lipotropic factors which would protect the liver after the drinking of alcohol. In cases of diabetes fatty infiltration and palpable liver were common, but cirrhosis was rare. He had known patients have recurrent haematemesis for 20 years.

Salicylates in Rheumatic Fever

Dr. G. WATKINSON (Leeds) then read a paper on salicylate therapy in acute rheumatic fever. It had first been advocated 73 years ago, but apart from its analgesic and antipyretic actions there was no agreement on its value. A new phase of therapy began in 1943 with the publication by Coburn of the dramatic effects resulting from massive controlled therapy. He had attempted to assess the value of the therapy by treating 90 R.A.F. recruits (87 men and 3 women) aged 18 who developed rheumatic fever between April, 1947, and September,

1949, with salicylates in various doses. Of these, 21 had had rheumatic fever previously; 71 had had an upper respiratory infection in the preceding two weeks, mostly with a positive haemolytic streptococcal throat swab. The results in those observed for 18 months were as follows:

Station	No. of Cases	Previous Rheumatic Fever	Dosage of Salicylates gr./daily	Days before Afebrile	Days before Free of Pain	Average B.S.R. on Admission	Days before Normal	Relapses
1	25	4	14 mil. 11 less than 100	19·6	22·6	43·8	65·9	6
2	30	6	200	5·0	6·0	45·3	38·5	2
3	31	9	200–600	2·4	2·2	60·3	18·3	9

High dosage shortened the period of fever and pain and brought the sedimentation rate (Westergren) more rapidly back to normal. There was some objection to using the sedimentation rate as an index of activity of the disease, since some workers had suggested that salicylates would lower this in other conditions such as pulmonary tuberculosis. He had made some observations on this and had found that the salicylates did have some effect in other conditions but not in the same way as in rheumatic fever.

The six patients in the series who had had pericarditis responded well on doses that were adequate to keep the blood salicylate level above 40 mg. per 100 ml.

The effect on permanent valvular damage was perhaps the most important matter to determine. In that series the number of patients who had ended with valvular disease of the heart was not statistically different in any of the three groups. There had been fewer, however, in the high-dose group who were left with a systolic murmur and had been classified as having potential heart disease. The figures of that experiment compared with those of Coburn were:

	Coburn		Watkinson		
Dosage of Salicylate gr./daily	No. of Cases	Valvular Disease of Heart Per cent.	No. of Cases	Valvular Disease of Heart Per cent.	Potential Heart Disease Per cent.
Less than 100	63	31·9	25	8	25
100–200 ..			30	16·6	23·3
200–600 ..	38	Nil	31	9·7	6·5

It seemed probable that none of the patients in the present series had had valvular defects before the attack of rheumatic fever, since they had been recruits, had just been through a medical board, and had had their chests *x*-rayed.

Toxic effects could be divided into three groups. In the first the symptoms were common but important, and did to some extent indicate that an adequate blood level had been reached. They were tinnitus, nausea, sweating, and transient vomiting. The second group were uncommon but serious, and included vertigo, drowsiness, mental upsets, and haemorrhage. The third group were common and alarming, and consisted of severe vomiting and hyperventilation. The occurrence of symptoms of the last two groups called for a modification of dosage.

SECTION OF OBSTETRICS AND GYNAECOLOGY

Friday, July 1

Functional Uterine Haemorrhage

With Miss GLADYS KAY (Harrogate), vice-president, in the chair, Mr. V. B. GREEN-ARMYTAGE (London) opened the discussion by reviewing the history of endometrial biopsy. It was well to remember that functional derangements of several types might result in abnormal bleeding. For instance, it might occur in the patient with a hyperplastic (oestrogenic) endometrium, or in one with an endometrium so atrophic that no material for section could be obtained. On the other hand it might be seen in patients who had either a progestational endometrium or even delayed shedding of the premenstrual membrane, a condition possibly due to some disturbance of the process of constriction of the spiral arteries of the endometrium. Bleeding in all these types was painless and perhaps most frequently seen in the young. Few would deny that the feminine glandular system could be deranged temporarily, and spontaneous cure might account for some of the apparent successes of hormone therapy.

What was the bleeding factor and how could it be controlled? He referred to cases where the psyche controlled metrorrhagia, just as it did amenorrhoea. When it did the individual rather than her organs of generation must become the object of therapy. The hypothalamus influenced the pituitary gland, and presumably it was not until the emotional tension was relieved that there was a return to normality. Functional bleeding, then, was a symptom rather than a disease.

He had consulted records of 384 cases of functional bleeding seen in private between 1930 and 1949. The following table showed the pathological findings in 326 patients between 12 and 45 years of age.

Slight enlargement of uterus	97	29·7%
Small cystic enlargement of one or both ovaries	23	7·05%
Endometrial (oestrogenic) hyperplasia ..	117	35·8%
Atrophic mucous membrane	30	9·2%
Mixed or irregular-patterned endometrium ..	13	3·9%
No abnormal histology	28	8·5%
Polypi, simple or adenomatous	14	4·25%
Endometrial tuberculosis	2	0·92%
Malignancy of corpus uteri	1	0·30%
Malignancy of endocervix	1	0·30%

In the series of 384 cases there were 63 cases of puberty or young-adolescent haemorrhage, 15 of which had to be corrected. Eleven patients were classified as having emotional haemorrhage when all other causes had been excluded. In 182 there were various stigmata of endocrine disorder, such as obesity, slight enlargement of the thyroid, etc.

Discussing treatment, Mr. Green-Armytage stressed the importance of first excluding physical, organic, conceptional, and more obvious endocrinal causes of excessive bleeding. If the patient was young and unmarried the administration of thyroid extract, 0.5 gr. (32 mg.) daily, increasing by 0.5 gr. weekly for six weeks, and Lugol's iodine, 10–15 min. (0.6–0.9 ml.), was excellent, but contraindicated in the thin or nervous subject. At the same time iron, liver, yeast, and possibly sedatives were given, and attention was paid to any source of mischief in the teeth, tonsils, and general hygiene. Very often change of food and environment was beneficial. If after 4–6 weeks of that treatment there was no improvement the "Hamblen Plan" was carried out. Stilboestrol, 2 mg. t.d.s., was prescribed for 20 days; at the end of 10 of these days ethisterone or progesterone, 10 mg. t.d.s., was given in addition. That regime must be undertaken at the onset of persistent bleeding. Stilboestrol, 5 mg. q.q.h., for 24–36 hours might be needed as a haemostatic, but there was a danger of profuse haemorrhage following this, necessitating immediate curettage. Androgen treatment might be preferred but was expensive. He did not use radium or *x* rays in this connexion. If a patient was at or about the age of 40 and had failed to react to hormonal treatment or curettage, then vaginal hysterectomy was the ideal procedure.

Dr. P. M. F. BISHOP (London), giving the viewpoint of the endocrinologist, said it might become the orthodox teaching that uterine bleeding was more intimately related to the condition of the uterine vessels than to the histology of the uterine mucosa. He had found that stilboestrol, 5–15 mg. 4-hourly, would stop bleeding within 24 hours, though it might cause nausea or vomiting. The second problem was to prevent troublesome bleeding, metropathia, and menorrhagia. The object in the former was to forestall the bleeding episode and substitute for it an apparently normal period. This could be done by giving progesterone, preferably by injection, in four doses of 20 mg. on alternate days ("medical curettage"). A repetition of the course of progesterone 20 days after the onset of the previous medical curettage would again forestall the tendency to a metropathic flooding.

Menorrhagia was a different problem, and probably mainly due to a disturbance of the normal oestrogen–progesterone ratio in the premenstrual phase. Individual cases required

different treatments—for example, chorionic gonadotropins to stimulate progesterone secretion (daily doses of 1,000 i.u.); progesterone to ensure total shedding of the endometrium; and androgens to antagonize the ovarian hormones, to atrophy the endometrium, or to exert a vascular haemostatic effect. In from one-third to one-half of the cases of functional menorrhagia a course of 10–15 mg. of methyl testosterone daily by mouth would reduce the bleeding, and remission followed for a few months. And there were cases of masked hypothyroidism in which 2–3 gr. (0.13–0.2 g.) of thyroid extract daily produced spectacular results. Endocrine therapy could offer no cure for functional uterine bleeding; nevertheless it could have limited, and on occasions spectacular, results. Endocrine therapy should be logically conceived, properly planned, and abandoned if it had obviously failed after a reasonable trial.

Dr. T. N. MACGREGOR (Edinburgh) said that each case at the Gynaecological Endocrine Clinic of the Royal Infirmary, Edinburgh, was investigated as follows: (1) Detailed history taken; (2) height, weight, and diet recorded (when indicated, an anti-obesity regime was adopted); (3) general physical examination, including haemoglobin estimation; (4) pelvic or rectal examination and endometrial biopsy; (5) given menstrual calendar and temperature chart for recording rectal temperature. At first, treatment was directed towards improving the general state of health. Functional uterine haemorrhages at puberty not responding to general measures could be treated effectively by progesterone (ethisterone, 20 mg. by mouth t.d.s., would clear up haemorrhage in 3–5 days, although the bleeding might be aggravated at first). Severe bleeding requiring immediate control was best treated by ethinyl oestradiol, 0.05 mg. t.d.s. Initial control of bleeding, whether by oestrogen or progesterone, was followed by the administration of ethisterone, 20 mg. t.d.s., from the 14th to the 24th day of the cycle. This treatment was repeated for 3–4 months. Metropathia haemorrhagica was treated similarly, but metropathic bleeding after the age of 35 should be investigated by careful curettage to exclude malignant disease. Such cases did not respond to progesterone so well as the younger cases, and often hysterectomy was necessary. But some cases did respond to short-wave diathermy, the response indicating mild pelvic infection, especially following childbirth or abortion. Male-hormone therapy was dangerous.

Professor A. M. CLAYE (Leeds), the president, asked what was the appropriate time for doing a curettage, and stressed the importance of exploring the uterus in women of 35 and over. He wondered why Dr. MacGregor used the rectal method for recording temperature. Dr. A. BARKER (East Kent) questioned the advisability of vaginal hysterectomy when there was a great possibility of endometriosis being present. He wanted to know the indications for implantation therapy. Mr. G. G. LENNON (Oxford) asked Mr. Green-Armytage if he did a vaginal hysterectomy when the cervix did not come down to the introitus, for many cases of functional uterine bleeding were in multiparae; and were cystic ovaries removed vaginally also? Dr. J. LÖVSET (Norway) thought metropathia was evidence of a Mendelian dominant.

Professor T. N. A. JEFFCOATE (Liverpool) considered that thyroid therapy was excellent. He did not think metropathia was so common as had been indicated. Polypi in the uterine cavity were often missed at curettage, and for that reason hystero-salpingography was useful. The uterine cavity should be explored by incision of the uterus prior to abdominal hysterectomy. Mr. G. W. THEOBALD (Bradford) said that the theory of the influence of the hypothalamus was one he had advanced many years before. Dr. ERWIN RABA (Israel) also contributed to the discussion.

In reply Mr. V. B. GREEN-ARMYTAGE said he regarded 12 days of bleeding (or inability to work) as indications for curettage. He removed the uterus vaginally even when the cervix did not descend, and he pricked or removed cysts of the ovaries vaginally.

Dr. BISHOP pointed out that even small doses of androgen could be harmful. The dosage must be kept under 300 mg. per month—for only two months at a time, with two-monthly intervals. If harmful effects were seen, they disappeared when administration was stopped, except for the deeper tone of voice. Implantation therapy was seldom indicated—ethisterone was not absorbed when implanted—and progesterone had to be put in deeply to avoid extrusion. There was no need to take the temperature per rectum. He endorsed the hypothalamic theory. Dr. MACGREGOR emphasized that, if endometrial biopsy was to be done, pregnancy had to be excluded. The only indication for implantation treatment was recurrent abortion, when progesterone was used. There might be a psychological effect of rectal temperature recording. Irregular bleeding in a woman older than 40 must be regarded as due to malignant growth until cancer was excluded.

SECTION OF PATHOLOGY AND BACTERIOLOGY

Friday, July 1

Pathology of Hypersensitivity Reactions

Dr. J. G. GREENFIELD (London), the vice-president, took the chair. Professor HILDING BERGSTRAND (Stockholm), discussing the pathological anatomy of hypersensitivity in man, thought the general term "hypersensitivity" was preferable to "allergy" if they were to appreciate the different manifestations in that group of disorders. They included anaphylactic shock—a rare disease in man—characterized by contraction of smooth muscle and dilatation of capillaries and small blood vessels due to an interaction between antigen and antibody in the tissues of the sensitized animal. A mild form of anaphylaxis, now becoming rare, was serum sickness, with joint pains and swellings, skin rashes, oedema, etc., appearing 7–10 days after injection of a foreign protein. The Arthus phenomenon was a severe local anaphylactic reaction of haemorrhage and ulceration following repeated intracutaneous injection of an antigen. Atopy was the American name given to a variety of allergic diseases in man, of which the prototype was pollen hypersensitivity; in asthma, contraction of the smooth bronchial muscle was a prominent feature, as it was in anaphylaxis. The skin rash of serum sickness had its corresponding atopic skin disease, such as infantile eczema. There was a group of hypersensitivity reactions associated with drugs which were not themselves antigenic but became so after conjugation with a protein. The tissue reaction here could be of either the atopic or the bacterial type; the latter was exemplified by contact dermatitis, in which there was a delayed, not an immediate, response to the antigen. In the bacterial type of tissue hypersensitivity, of which the tuberculin reaction was the prototype, all the cells of the body seemed to be sensitized, in contrast to the localized sensitivity of smooth muscle and endothelium in the anaphylactic reaction. That difference could be demonstrated by experiments on the avascular cornea.

Capillary damage was the main feature of the tissue changes in hypersensitivity diseases. Characteristically it occurred as a focal neurosis with fibrinoid thrombi and some secondary haemorrhage, and that capillary damage could probably explain such phenomena as urticaria, angioneurotic oedema, and joint swellings. Changes in the larger vessels had the character of periarteritis nodosa, with focal necrosis, intramural and perivascular cell infiltration, and proliferation of the vascular endothelium to such an extent that the lumen might be occluded. The secondary changes in the connective tissue consisted of oedema and focal splitting of the collagen fibres into reticulin fibrils which stained black with silver. That was followed by fibroblastic reaction and formation of the "rheumatic" granuloma. An outstanding feature of most hypersensitivity reactions was the localization in different organs, with a markedly focal distribution in the affected organ. That the localization was related to the nature of the antigen was suggested by the finding that rabbits sensitized with albumin developed vascular lesions of the periarteritis-nodosa type, whereas with gamma-globulin glomerulonephritis was the most prominent lesion. The capricious distribution of the lesions would account for the diversity of the hypersensitivity diseases—polyarthritis, endocarditis, pneumonitis, glomerulonephritis, periarteritis nodosa, lupus erythematosus, etc. He hoped that

there might be a closer integration of the clinical, serological, and pathological findings in these hypersensitivity disorders.

Professor M. J. STEWART (Leeds) demonstrated the histological changes in two cases of "allergic prostatitis," both in elderly asthmatics. The characteristic focal granulomata were present, together with a gross eosinophilia, present also in the glandular tissue, so that the eosinophils would presumably have been found in the urinary deposit. Professor K. R. HILL (Jamaica), who had recently worked with Professor Rich, thought that anaphylactic and bacterial sensitivity should be regarded as essentially similar; he discussed "collagenosis" and a paramyeloid condition, both of which were probably hypersensitivity tissue reactions. Professor R. J. V. PULVERTAFT wondered if the acute blood changes—haemolytic anaemia and granulocytopenia—following sulphonamide therapy were sensitivity phenomena; he was interested in the local eosinophilia that sometimes accompanied acute gastric ulcers and appendicitis. Dr. H. ROYLE (London) remarked on the importance of histamine in allergic reactions, but noted that eosinophilia was absent when histamine was used to produce these reactions experimentally. Dr. PURDON MARTIN (London) asked about auto-sensitization, with particular reference to encephalopathies.

Temporal Arteritis

Dr. C. V. HARRISON (London) said that temporal arteritis produced, in the elderly of either sex, a general illness which preceded and outlasted the local signs and which was much more severe than would be expected. It affected mainly the temporal arteries, but the facial and occipital arteries were sometimes involved too, and in about one-third of the cases involvement of the ophthalmic vessels led to blindness in one or both eyes. In a few cases seen at necropsy there had been involvement of many internal arteries as well. Clinically there was intense headache and often fever, leucocytosis (though rarely eosinophilia), and a high E.S.R. The affected arteries were thick, cordlike, and tender, and the skin might be reddened. Removal of a segment of the artery for biopsy seemed to be the most reliable method of giving symptomatic relief. Lantern plates of six cases of temporal arteritis and two cases of polyarteritis were shown to demonstrate the characteristic histology of the former (narrowed lumen, greatly thickened intima with characteristic histology, and inflammatory infiltration of media and adventitia) and the similarity of the two diseases. It was concluded that temporal arteritis was a characteristic disease both clinically and pathologically, but that it resembled polyarteritis enough to justify the view that they might be of similar aetiology.

Professor BERGSTRAND believed that temporal arteritis was merely a form of polyarteritis, and Professor PULVERTAFT recalled two cases of temporal arteritis, one of which had eosinophilia.

Vascular Changes in Diabetes

Discussing the vascular changes in diabetes, with particular reference to the renal and retinal vessels, Dr. NORMAN ASHTON (London) compared the histopathological changes in the retina with the general vascular condition and the kidney lesions in 32 fatal cases of diabetes. With the aid of new staining methods, particularly the periodic acid technique of oxidizing polysaccharides to polyaldehydes and then staining with fuchsin-sulphite, he showed, with a series of coloured lantern slides, that the essential lesion was a capillary microaneurysm confined to the retinal vessels and chiefly localized in the posterior polar region in the capillaries which link the deeper and more superficial plexuses. He compared the occurrence of this retinopathy, graded according to severity, with the presence of intercapillary glomerulosclerosis, and found that the more severe the retinopathy the more constant was the association with this particular renal lesion. The two conditions were manifestations of the same pathological process modified by different anatomical structures. He hoped that histochemical methods would be used to find if the waxy exudate in the retinopathy was the same as the hyaline material in the glomerulosclerotic lesion. Professor K. R. HILL believed that the hyaline masses in the glomerulus in intracapillary glomerulosclerosis were in fact microaneurysms, as could be shown by serial section.

SECTION OF RADIOLOGY

Friday, July 1

Radiology of Joints

Under the chairmanship of Dr. C. G. HITCHCOCK (Harrogate), vice-president, a discussion took place on the radiology of joints. Dr. E. DUFF GRAY (Manchester) said that in the radiological examination of joints the following features required individual study: (1) The "joint-space," (2) the articular surfaces, (3) the architecture and density of the neighbouring bones, (4) the para-articular soft tissues, and (5) the effects of movement and posture. The routine radiographic projections were well known and had become largely standardized; their aim was to show as much bone-free joint-space as possible and to demonstrate the relationships of the opposing articular surfaces. The true joint-space was not normally seen, but could be readily demonstrated by the special technique of "arthrography," and might be occasionally visible when conditions were suitable for the "vacuum phenomenon." The density of the bones near a joint might be estimated by the simultaneous exposure of a similar bone embedded in a special medium to represent the soft tissues in the living subject or by the densitometry readings of a selenium cell with comparative readings of graduated ivory cylinders. The effects of movement and posture had not yet been fully studied radiologically. Lateral films of the cervical spine in flexion and extension seemed to provide a fruitful field for inquiry. A special method of using tracings from such films allowed a ready appreciation of the extent and type of the movement taking place at each vertebral level. It seemed likely that the cervical spine was an early site for rheumatoid arthritis, and its involvement might be indicated by the radiological demonstration of abnormal movement at one or more levels. In the study of joint lesions *x*-ray examination of parts of the body other than the affected joints might be useful, and in the search for a "toxic focus" a wide range of radiological methods was employed. The interpretation of abnormal radiological findings required in most cases a consideration of the history and the clinical picture, because the *x*-ray appearances of joint lesions were rarely specific.

Dr. J. B. KING (Edinburgh) spoke of various respects in which the radiologist could afford more help to the orthopaedist. Everybody who had worked on the subject of degenerative arthritis—a term which he preferred to osteoarthritis—agreed that there was a hereditary predisposing factor in its development, but no attempt had been made scientifically to ascertain to what extent hereditary and acquired factors existed in different individuals. An American observation had shown that identical twins later in life showed similar degrees of costal-cartilage degeneration. This suggested a possibility for research. It might be useful to *x*-ray the cervical spine in a series of identical twins—a fair number would have to be taken because of the likelihood that in many cases the hereditary condition would be obscured by the result of trauma, including the trauma of gravity—and to ascertain to what extent the joints of twins showed similar degenerative arthritis.

After Dr. J. H. WILDING (Manchester) had given a demonstration of the radiological appearances in various conditions of the knee-joint, Dr. J. BLAIR HARTLEY (Manchester) spoke of a certain drifting apart of orthopaedic and radiological departments. Discussions between radiologists and orthopaedic surgeons ought to be more frequent. The radiologist did not always assist the orthopaedic surgeon as he might. How often, for example, was the orthopaedic surgeon presented with pictures of the ankle-joint or joints of the foot taken with the patient lying down, which must be useless when the case was one of flat-foot? An obligation which he always imposed upon himself was to *x*-ray the opposite—i.e., the normal—joint as well as the joint affected. On one point he differed from the opener, who had said that it was in the cervical spine that rheumatoid arthritis began; in his own observation rheumatoid arthritis attacked the cervical spine late.

Dr. R. FAWCITT (Ulverston) said that radiologists saw as patients very few of the people of whom they took radiographs, and if the orthopaedic surgeon would take a little more trouble to tell them something about the patients it might result in

more helpful positioning and radiography. Dr. J. L. A. GROUT (president of the Section) said that his impression was that ankylosing spondylitis started not in the cervical spine but in the sacro-iliac joint, and this joint should always be included in the examination. He had recently visited a steel firm which had a 400-kV machine for the *x*-ray examination of its material, and he found that they were accustomed always to take eight projections; for the human being it was customary to make use of only two films—antero-posterior and lateral. Dr. LEO DELICATI (Buxton) believed that ankylosing spondylitis and rheumatoid arthritis were the same disease in two different forms. Motion films would be extremely valuable in the elucidation of many points concerning joint structure and aberrations. Dr. J. ALEX THOMPSON (Harrogate) urged the formulation of a standard technique, with standard screens and probably standard exposures based upon the thickness of the part, so that early rarefaction of the bone might be better recognized. It was absurd to have exactly the same technique for the delicate hand of a lady and the thick hand of a labourer.

Dr. W. R. MITCHELL (Northampton) spoke of the problem of detecting very early changes in the articular cartilage of the patella. One of his own early cases had no significant bony change, but the patella showed a frond-like process 2 cm. long. He had no doubt that many arthritic conditions which they were called upon to treat in people over the age of 40 did start in the adolescent years with this peculiar condition of the articular cartilage of the patella, which did not seem to be found in other joints. As an orthopaedic surgeon he had been surprised not to hear more about cineradiography of joints.

SECTION OF SURGERY

Friday, July 1

Pain in Right Iliac Fossa

With the president, Mr. T. V. PEARCE (Harrogate), in the chair, Dr. A. FULLERTON (Batley) opened the discussion by referring to pain in the right iliac fossa as the Cinderella of the abdomen, with the appendix and the right ovary in the roles of the ugly sisters. Pain in general was classified as physiogenic (visceral, referred, and somatic) and psychogenic (anxiety, hysterical, and so on). Visceral pain was due to interference with the blood supply of a viscus, referred pain to deep-seated stimulation of cerebrospinal sensory nerves, anxiety pain to fear, and hysterical pain to a craving for sympathy. If pain in the right iliac fossa, present for more than a week, was due to appendicitis, a lump would be palpable. Chronic pain in the right iliac fossa was never due to appendicitis, or to adhesions, or to a right ovary free from demonstrable disease. Visceroptosis never caused pain in a patient whose autonomic nervous system and emotional reactions were well balanced. In distinguishing between physiogenic and psychogenic pain, age, sex, fertility, emotional conflict, and duration were important; and the prognosis of a psychogenic pain depended on its duration. Appendicectomy was advised for psychogenic pain in the right iliac fossa to remove anxiety about appendicitis. It relieved the doctor of the need to consider appendicitis at each outburst of functional pain, and gave an opportunity for complete exploration of the abdomen to exclude organic disease.

Professor DIGBY CHAMBERLAIN (Leeds) said that when a surgical opinion was sought it was usually with the idea of deciding whether or not pain in the right iliac fossa was due to appendicitis. Surgeons had tried to impress on the general public that that kind of pain might be due to appendicitis, and had been so successful that the public now almost regarded pain in the right iliac fossa and appendicitis as synonymous. Appendicitis might be acute, recurrent, or chronic. Chronic appendicitis was not characterized by chronic pain in the right iliac fossa, and the term "grumbling appendix" was a bad one, had no pathological basis, and should be discarded. In chronic right iliac fossa pain, when the diagnosis was in doubt, there was rarely urgency; in occasional cases, when doubt continued and operation was considered desirable, an exploratory laparotomy should be done and not an appendicectomy through a limited incision.

Mr. KENNETH BOWES (London), discussing the gynaecological aspects of the subject, said that pain from the ovary was referred to the tenth dorsal nerve and pain from the tube to the eleventh, so that the territories of surgeon and gynaecologist overlapped. When consulted, the gynaecologist might find some definite pathological condition of uterus, ovary, or tube, but often he found either no lesion at all, or else one of those pelvic conditions which are neither well defined nor well understood. Endometriosis in the infertile woman of over 30 caused recurring attacks of pain on one or other side, often referred down the inner aspect of the thigh, premenstrual, and relieved by menstruation. Absence of physical signs did not exclude endometriosis; sometimes a palpable swelling followed the onset of symptoms by several months. It was now known that endometriosis was common in the twenties, and 4% of affected women were in the 'teens, so for this reason alone a diagnosis of neurosis must be made with caution. In the treatment of endometriosis, conservatism should be exercised towards ovarian tissue. Partial resection was preferred to oophorectomy.

Straight *x*-ray examination was sometimes of value in revealing ossification in a dermoid—a common cause of continuous pain, with acute exacerbations if torsion occurred. Intermenstrual pain (*Mittelschmerz*) particularly masqueraded as appendicitis if accompanied, as it commonly was, by low pyrexia at ovulation. In the middle-aged woman persistent and rather vague pain suggested carcinoma of the ovary and required urgent treatment, for pain meant penetration of the ovarian capsule. A history of menorrhagia with chronic and usually bilateral pain in the abdomen, together with a tender swollen tube felt on palpation, was characteristic of chronic salpingitis.

A less definite group of patients presented in the adult sex-functioning age period with evidence neither of inflammation nor of any other definite single pathological condition. Pain was referred low in one or other iliac fossa, but usually the right, and there was low backache and dyspareunia. The pain, which was premenstrual, was increased by effort, standing, or emotional strain. Intermittent attacks of acute pain might simulate appendicitis but were accompanied by agitation and emotional reaction. On physical examination there might be tenderness in an ovary or lateral to the cervix, which might be infected. There might be urinary symptoms too, or mammary discomfort, or such psychological concomitants as insomnia, frigidity, headache, or excessive fatigue. Fertility was often low. It was unlikely that psychological disturbance was alone to blame. Disturbances in pelvic circulation might be important, for they could be effected by gravity, bowel function, endocrine influences, and nervous stimulation. Such patients did not require surgical intervention.

Mr. G. H. MACNAB (London), considering right iliac fossa pain in childhood, said that the frequency of abdominal pain in childhood was due to immaturity of the lymphatic system, which seemed over-responsive to infection. He gave a clinical description of abdominal lymphadenitis, non-specific and tuberculous. Mr. M. W. C. OLDFIELD (Leeds) recalled the observation of Braithwaite that an enlarged lymph node could cause pain mechanically, its rough surface scraping over adjacent peritoneum. Mr. PHILIP TURNER (London) added Meckel's diverticulum to the list of causes of pain in the right iliac fossa previously considered, and described two cases of that condition. Spasm of the colon and orchitis in an abdominal testis might also cause right iliac fossa pain on occasion. Mr. IAN FRASER (Belfast) described chronic appendicitis as a sociological phenomenon because of the present pressure on hospital beds. He disagreed with a previous speaker about the age at which the abdominal lymphoid tissue reached full development; in his view that tissue was enormous in quantity, particularly in the young child.

Mr. DICKSON WRIGHT (London) recalled that tragedies had occurred from concluding that a child suffering from tonsillitis and abdominal pain must be suffering from lymphadenitis rather than the appendicitis which was really present. He also disagreed that castor oil was dangerous in itself; it was the delay associated with purgation rather than the purgation itself which was important. He could not believe that the removal of a normal appendix was ever followed by

lifelong invalidism, and he had no hesitation in performing appendicectomy if the diagnosis was doubtful. He used at operation a small incision, big enough only to introduce a finger into the pelvis and to withdraw the ileum for the detection of a Meckel's diverticulum. Girls in the late 'teens suffering from right iliac fossa pain were a common problem and were best treated by appendicectomy. Mr. T. V. PEARCE, the president, recalled from his experience some rare causes of pain in the right iliac fossa. There was a remarkable case of mediastinal abscess, consequent on quinsy, which pointed as a psoas abscess in the right iliac fossa.

Dr. FULLERTON, replying, had found that a tender spot above and to the left of the umbilicus (Power's point) was commonly present in cases of adenitis.

SECTION OF CARDIOLOGY

Friday, July 1

Simulation of Heart Disease by Other Conditions

Dr. RAE GILCHRIST (Edinburgh), in discussing common errors in diagnosis, said that he believed that many mistakes could be avoided if more time were spent in obtaining an accurate history, and particularly in paying attention to the manner in which the story was told. This applied especially to the interpretation of symptoms such as pain. Angina pectoris, for example, had to be diagnosed entirely on the history, not by physical signs. When a patient complained of pain in the chest the chances were that it was not angina pectoris or any other organic disorder. If a person was able to take a brisk walk on a cold day one could be fairly confident that angina was not present.

The speaker then discussed the differential diagnosis between cardiac infarction and massive pulmonary embolism. He stressed that (1) a patient in bed or during convalescence on account of some other illness was far more likely to develop pulmonary embolism than cardiac infarction; (2) the onset of symptoms was abrupt in pulmonary embolism, and they reached their maximum severity at once, whereas in cardiac infarction there was often delay before the symptoms reached their peak; (3) pain in massive pulmonary embolism was admittedly central, but did not, as a rule, radiate; moreover, it was rarely severe, being more properly described as distress from suffocation; (4) in pulmonary embolism, dyspnoea was sudden and intense, whereas in cardiac infarction it was rarely conspicuous at the onset. The distinction could usually be made clinically, although the electrocardiogram was helpful in doubtful cases.

Dr. Gilchrist then turned to physical signs. He had found that hypotension often gave rise to anxiety and that the significance of a fall in pressure following cardiac infarction was apt to be overemphasized. This fall was often only slight and in some cases did not occur at all; on the other hand, low blood pressure frequently resulted from long-continued sepsis or other infection. Oedema was caused by many agents other than heart failure; and in the absence of dyspnoea it was rarely cardiac in origin.

Speaking more generally, Dr. Gilchrist emphasized the importance of avoiding terms like "fatty heart": it was better to tell an obese patient that he had a Rolls-Royce engine but that the bodywork was poor. It was important to weigh the patient. A neurosis could be detected by studying the patient's personality; organic heart disease was rare without dyspnoea; it was often more important to measure the haemoglobin than to take an electrocardiogram; and, finally, fewer mistakes would be made if the physician always demanded an aetiological diagnosis. Even so there was a borderline group in which it was by no means easy to be sure whether there was organic heart disease or not. There was Gowers's syndrome, characterized by weakness, prostration, and bradycardia lasting half an hour or so, in middle-aged women—Ryle's vaso-medullary storms; and there were cases of apparent heart failure in pregnancy in which follow-up studies showed no evidence of heart disease. In fact, in 380 follow-up examinations of cases of heart disease detected in pregnancy 10% appeared to be normal subsequently.

Dr. J. CLIFFORD HOYLE (London) dealt with the simulation of heart disease by pulmonary disease. Purulent sputum was never cardiac in origin. Cough was dominant in heart disease only in the presence of congestive heart failure, gross cardiac enlargement, or aneurysmal dilatation of the left auricle, pulmonary embolism, or pericarditis. Dyspnoea could rarely be ascribed to disease of the heart if that organ was not enlarged, and it was rare for patients with bronchial asthma to develop cor pulmonale. He also stressed the absence of electrocardiographic changes in cases of dyspnoea due to pulmonary disorders.

Paroxysmal dyspnoea, though suggestive of left ventricular failure, might also be due to bullous disease of the lungs or to partial bronchial stenosis with recurrent collapse. Haemoptysis appeared late in heart disease, whereas it often complicated the earlier development of pulmonary disease. Pain radiating into the left shoulder and arm might be due to apical pleural adhesions, and sternal pain might result from mediastinal tumours.

In radiological differential diagnosis Dr. Hoyle pointed out that difficulty might arise in distinguishing between dilated pulmonary arteries and hilar adenopathy, and between the appearances of lymph stasis associated with sarcoidosis, for example, and pulmonary congestion in mitral stenosis, particularly when associated with haemosiderosis; and finally between neoplasm or other space-filling tumours and aneurysm.

Dr. S. W. PATTERSON (Ruthin Castle) discussed the simulation of heart disease by intestinal disease. He lent support to the old aphorism about patients complaining of indigestion having heart disease, and vice versa. He described the painful effects of diaphragmatic hernia, and pointed out that dyspnoea and sweating might accompany attacks. Such pain, however, was not closely related to effort. Breathlessness might be due to the anaemia associated with a bleeding ulcer, gastric neoplasm, or haemorrhage from bleeding haemorrhoids. Vomiting and collapse due to food poisoning was sometimes mistaken for coronary thrombosis.

He went on to discuss reflex disturbances of cardiovascular function, and quoted a case of paroxysmal tachycardia cured by appendicectomy. He showed electrocardiograms and graphic records of respiration and blood pressure illustrating cardiorespiratory dysfunction resulting from oesophageal, gastric, biliary, or colonic distension. Psychosomatic cardiovascular disturbances should not be confused with reflex disorders of the type described.

Dr. WILLIAM PHILLIPS (Cardiff) described the simulation of heart disease by psychoneurosis. Numerous vague and indefinable symptoms, especially faintness, dizziness, palpitations, weakness, exhaustion, and left inframammary pain, were commonly psychoneurotic. In the history of man most of the common emotions had been described in terms of the heart. It was not a bizarre situation that mattered most in psychiatric aetiology, but the ordinary day-to-day disappointments, difficulties, and anxieties. Frequent sighs and inability to take a deep breath were always psychiatric in origin. The only common symptom of organic heart disease was pain or breathlessness on effort; psychoneurotic pain or breathlessness was far less closely related to exertion.

Psychoneurosis might be referred to the cardiovascular system: (1) because innocent symptoms were attributed to the heart by either the patient or his doctor; (2) following a cardiac illness or death in the family or in the patient's circle of friends; (3) because of incautious statements or actions by medical advisers; (4) because there had been no proper reassurance. He thought that 90% of these difficulties would be resolved if there were sufficient time to take a proper history and to study the patient as a human being. Physicians must insist on a full aetiological, structural, and functional diagnosis of organic heart disease; terms such as "tired," "fatty," or "strained" heart should be condemned.

Obstinate Heart Failure

Dr. D. EVAN BEDFORD (London) opened this discussion by defining the term "obstinate heart failure." He considered it meant congestive heart failure with oedema continuing in a

patient at rest in bed and despite routine therapeutic measures, including digitalis, mercurial diuretics, and limitation of salt and water; or a similar situation recurring as soon as a patient became ambulant; or persistent left ventricular failure or elevation of the venous pressure and enlargement of the liver without oedema in similar circumstances. The first consideration was to make sure that no aetiological agent which could be corrected was responsible, such as thyrotoxicosis, anaemia, avitaminosis, and Pick's disease. The next step might be to put the patient into a wheel-chair, for it was possible to keep a patient in bed too long. Phlebothrombosis with recurrent pulmonary embolism was encouraged by prolonged recumbency. Dr. Bedford had never been convinced that anything could be gained by giving mercurial diuretics more often than twice weekly; but in cases of obstinate ascites the intraperitoneal route was sometimes helpful; another variation that might help was to change from "neptal" to mersalyl or vice versa when the response became poor. Mechanical drainage of fluid through incisions made over the dorsum of the foot was advised in cases of persistent dropsy. The patient should sit in a chair with the legs down not only while the fluid was draining away but also beforehand, so that the legs were tense before the incisions were made.

A low sodium diet was undoubtedly of great benefit. In an ordinary hospital light diet 3–5 g. of sodium could be expected; sodium could be reduced to 2–4 g. by eliminating table salt and cooking salt; but this was not enough, for less than 2 g. of sodium per day was required. Bread and butter were the chief difficulties in London. The Karrell diet, consisting of 900 ml. of skimmed milk per day, contained 0.4 g. of sodium. The Kempner diet, consisting of rice, fruit, and sugar, contained only 0.15 g. of sodium per day. Modified diets could be arranged of 1,000–2,000 calories, containing from 0.5–2 g. of sodium per day, and these were very helpful in prolonged treatment; but a low calorie diet was often beneficial in itself.

With ambulant patients a close watch should be kept on their weight, and effective treatment should not be withheld until oedema was manifest. Dr. Bedford then discussed the results of therapeutic myxoedema, induced either by means of total ablation of the thyroid gland or by thiouracil derivatives. Myxoedema benefited cases of heart failure not only by reducing the oxygen requirement and therefore the work of the heart, but also by lowering the heart rate. The latter applied particularly to cases of auricular fibrillation or flutter in which the heart rate could not be properly controlled by ordinary means. Therapeutic myxoedema was far less helpful in cases of obstinate oedema than in patients with persistent left ventricular failure or intractable angina. The results of total thyroidectomy were probably better than those with thiouracil, and the mortality rate was not higher. He had used methyl thiouracil in doses of 600 mg. daily in 35 cases of persistent heart failure with good results in 50%; three developed agranulocytosis, and one of these patients died.

He did not object to patients prescribing vitamin E for themselves, for he felt fairly confident that it did them no harm. He used anticoagulants for those with phlebothrombosis. Recent surgical measures devised for particular situations were mentioned. They included ligation of the inferior vena cava and tricuspid valvulotomy for patients with severe pulmonary congestion; anastomosis of a pulmonary vein to the azygos vein in cases of severe mitral stenosis with recurrent attacks of pulmonary oedema; and mitral valvulotomy.

Dr. D. R. CAMERON (York) described the low sodium diet and the results of this treatment in greater detail. He had been able to obtain salt-free bread and butter in Liverpool and admitted that this eased the difficulties in arranging a suitable diet. He was able to provide for these patients 2,000 calories daily containing only 0.4 g. of sodium. In cases of congestive heart failure under control the addition of 2–5 g. of sodium chloride daily caused a demonstrable rise in body weight within a few days. With a satisfactory diet the daily excretion of sodium chloride should not exceed 1–2 g.; using a strict Kempner diet it rarely exceeded 0.25 g. A series of charts were shown illustrating not only the proof that a low sodium diet was beneficial but also the difficulties that were met in coming to such a conclusion.

SECTION OF DERMATOLOGY

Friday, July 1

Psoriasis

With the president, Dr. J. T. INGRAM (Leeds), in the chair, Dr. H. W. BARBER (London) in a stimulating and provocative opening paper stressed the similarity between the problems of psoriasis and of rheumatoid arthritis. He would not exclude the possibility of a specific infective organism such as a virus playing an important part in the aetiology, as in herpes simplex. The weight of evidence, however, was in support of psoriasis being a non-specific reaction of the skin to various kinds of stress in persons with an inborn tendency to that pattern of reaction. There was no specific treatment for psoriasis. The work of Danysz, who produced a variety of non-specific diseases in experimental animals by repeated injection of a foreign protein, was discussed. The particular "target organ" which reacted was specific for the individual. The work of Selye with pituitary and adrenocortical extracts was important, and his term "diseases of adaptation" was very apt.

The relationship of psoriasis to rheumatic fever in childhood and to rheumatoid arthritis, gout, and other "rheumatic conditions" in the adult was considered, and also the occasional association with so-called allergic diseases. Age at onset, race, and climate were all significant. Among the many factors which might be operative in the aetiology of psoriasis attention was drawn to the influence of infections, especially streptococcal infections. This guttate reaction to infections was seen particularly in children. The influence of the menopause in provoking a particular pattern of psoriatic reaction was noted; other influences, such as errors of metabolism and shock or emotional disturbances, were important provocative factors. Pregnancy and jaundice commonly had a temporary beneficial effect upon the course of psoriasis and of rheumatoid arthritis. The association of psoriasis with rheumatoid arthritis was a recognized syndrome. Gout with secondary osteoarthritis when associated with psoriasis gave a very similar picture.

Dr. Barber described two patients in whom the ingestion of cow's milk seemed to be responsible for the eruption of psoriasis, and he felt that the question of food allergy called for further research. Each case of psoriasis had to be considered individually, and if the provoking cause or causes could be determined in a particular case there was a good chance of successful treatment.

Dr. BRIAN F. RUSSELL (London) took the view that the psoriatic state, often latent, was hereditary and probably indicated some error in fat metabolism not yet elucidated. This underlying state, however, might not call for treatment; it was the provocative causes of exacerbations of the condition which had to be treated. In this regard two large groups were those cases following infective states and those associated with psychogenic disturbances. In the latter group the eruption was often of flexural distribution; it would seem that pruritus was commonly the primary symptom and psoriasis appeared secondarily as the result of friction.

Psoriasis was a skin reaction to a wide range of stresses, including all grades of physical injury, lack or excess of sunlight, cold, fatigue, infections, bacterial toxins, drugs, emotional difficulties, and endocrine disturbances. The skin was the organ which suffered, because of an inherited biochemical fault resulting in defective keratinization, a fault which was latent until aggravated by one of these stresses. The stresses were similar in nature to those which might excite rheumatoid arthritis. The tendency in both disorders to spontaneous remissions and relapses, improvement in pregnancy, and response to non-specific measures all seemed to support the possibility that they might both arise from repeated stimulation leading to failure of adaptation in the endocrine–autonomic system.

Dr. J. H. TWISTON DAVIES (Manchester), commenting on Dr. Barber's consideration of the arthropathic forms of psoriasis, drew attention to analogies in other dermatoses. He discussed the generalized form of guttate psoriasis of isolated or seasonal occurrence and its possible relationship to what he termed "seborrhoea." He criticized the conventional classification of

skin diseases. He agreed that psoriasis could sometimes be cured, but felt that in many cases it was better for the patient to adjust his emotional reaction to the infirmity rather than labour with the conventional lines of treatment. He stressed the difficulty of assessing the value of physical and chemical methods of treatment.

In a lively discussion which followed the opening papers Dr. HERBERT BROWN (Glasgow) compared psoriasis of the vulva and peri-anal regions with neurodermatitis in these sites and thought they were often of similar significance; *x*-ray therapy was often useful. Dr. G. A. GRANT PETERKIN (Edinburgh) recognized heredity and trauma as playing a part but raised the question of a filterable virus and quoted cases suggesting contagion. He thought that psoriasis in hot countries was caused by sweating and friction. Sir Norman Walker had employed the "so-called" Goeckermann treatment many years ago. Dr. F. F. HELLIER (Leeds) thought that treatment which included sunlight therapy increased the patient's resistance and diminished the possibility of relapse. Dr. G. HODGSON (Cardiff) said he had seen the part played by trauma as an aetiological factor in mine workers. Dr. MARY SMITH (Glasgow) suggested that those who did not tan were more readily affected, but Dr. A. BIGHAM (Bradford) said he had seen many cases of psoriasis in coloured troops in India.

Dr. H. R. VICKERS (Sheffield) had found thorium X of value in psoriasis of the scalp, and Dr. W. N. LEAK (Winsford) put in a plea for dithranol to be prescribed in cream bases in tubes so as to reduce the staining of clothes. Dr. S. T. ANNING (Leeds) protested against the psoriatic patient being left untreated. Dr. J. T. INGRAM (Leeds) mentioned a patient who had been under his care in infancy with eczema, at 7 years of age with alopecia, and now at 14 for psoriasis. Others who contributed to the discussion were Dr. C. D. EVANS (Bristol), Dr. MCKINLEY (Derby), and Dr. A. J. E. BARLOW (Huddersfield).

In reply Dr. BARBER said that, while a first treatment with *x* rays was often effective, subsequent treatments were not. He stressed the importance of focal infection and quoted the analogous relationship in tuberculide and dermatophytide reactions.

Use and Abuse of Chemotherapy

Dr. F. F. HELLIER (Leeds) introduced a discussion on chemotherapy in dermatology. Penicillin and sulphonamides were frequently prescribed when there was no justification for their use. Penicillin was probably more effective and less likely to give rise to sensitization if used as a lotion or spray. It was of value in the treatment of impetigo, ecthyma, infected ulcers, folliculitis, and sycosis. It should not be used in eczematous states even though infected. The application should be limited to a seven-day period. Sycosis often relapsed through infection being carried in the nostrils, and they should therefore receive treatment.

Parenteral therapy was suitable for deep infections; procaine penicillin was more efficient and less painful than other forms. Its use by mouth should be restricted to infants under the age of 6 months. Common reactions to the drug were erythema and urticaria, though asthma and exfoliative dermatitis might occur. Sulphonamides should not be used for local treatment for longer than five days. Internally they should be given in an adequate dosage for about five days. Sulphonamide dermatitis was now less common, but if it occurred it was very intractable. It was characterized by vesicles about the fingers suggesting a dermatophytide eruption. Recently attention had been drawn to the occasional appearance of periarteritis nodosa as a result of sensitization to sulphonamides.

Dr. P. B. MUMFORD (Manchester) did not think penicillin or sulphonamides should be used locally, and he did not regard the use of soap and water as helpful in the treatment of boils. Dr. H. W. BARBER (London) mentioned a case of periarteritis nodosa due to sulphonamides. He restricted the use of sulphonamides to a single five-day course. Dr. H. R. VICKERS (Sheffield) felt that the specialist did not see the large number of cases treated successfully by general practitioners. He saw much less pyodermia in children than previously, and he thought sensitization in children was very rare. Dr. W. N. LEAK (Winsford) suggested that the microform sulphathiazole used as a cream was more efficacious. Dr. LIPMAN COHEN (London) thought thyrotricin should replace penicillin and the sulphonamides in local therapy, as sensitization to this antibiotic was rare. Dr. P. INMAN (Sunderland) and Dr. A. CARLETON (Oxford), however, mentioned cases of sensitization to thyrotricin. Dr. A. J. E. BARLOW (Huddersfield) had seen penicillin dermatitis follow the insertion of penicillin tablets into dental sockets.

SECTION OF OPHTHALMOLOGY

Friday, July 1

Toxoplasmosis

Under the chairmanship of Mr. N. P. R. GALLOWAY (Nottingham), vice-president, a paper on toxoplasmosis was read by Mr. A. B. NUTT (Sheffield). He described the case of a 3½-year-old girl with signs of old central choroido-retinitis in each fundus together with mental backwardness. Two years previously, when he had first seen the child, a diagnosis of toxoplasmosis had not been considered, because at that time no *known* cases had been seen in this country. But the ravages of the disease might well have been misinterpreted as instances of congenital malformation or as the consequences of other infective agents. During a study visit of the Faculty of Ophthalmologists to Professor Franceschetti's clinic at Geneva last year Mr. Nutt had had the opportunity of hearing Dr. Bamatter's account of toxoplasmosis and to examine a number of cases assembled by that observer. Being struck by certain features of resemblance to his own case, Mr. Nutt had investigated the girl's case on returning to England. No radiological signs of intracranial calcification had been found, but that feature was neither pathognomonic nor invariable. Admittedly the toxoplasma had not been identified, but the intracellular protozoön was notoriously elusive, even during the acute stage of the disease. Laboratory tests, however, had given results supporting that diagnosis, towards which the clinical features had already drawn his attention.

In that case there had been no history of any severe illness before the child's vision had first been presumed to be defective, but intrauterine infection was a well-recognized mode of acquiring toxoplasmosis, and the house inhabited by her mother during pregnancy had contained a dog and was infested by mice. Mice, guinea-pigs, cats, and dogs are among the animals suspected of conveying the organism. Several cases had been reported in a family of taxidermists, and one of Dr. Bamatter's patients had been a woman whose pillow had been shared with a cat.

Clearly the problem of toxoplasmosis required further research, and so far the results of treatment had been disappointing, nor was it yet known to what extent prevention was possible. Meanwhile clinicians should bear in mind the possibility of this protozoal disease as an explanation for low-grade intelligence in association with bilateral patches of old central choroido-retinitis characterized by large size, irregular pigment proliferation, and clear-cut margins. Mr. Nutt's coloured fundus drawings clearly displayed these features, and in his case no similar lesions were present in the outlying regions of either fundus. Peripheral lesions did occur, and might reach a size many times greater than that of the optic disk. When the intrauterine devastation wrought by rubella was first revealed by Australian observers, clinicians in other parts of the world were sometimes inclined to suggest that disease as an explanation for lesions readily attributable to other maladies. The same tendency was already becoming evident with regard to toxoplasmosis. Nevertheless, the disease could no longer be dismissed as a remote possibility in Britain. Hitherto most of the cases recorded had been in inhabitants of the U.S.A. or the European mainland, and he could find only one published case in our literature at the time of reading his paper. (A report by Mr. Harold Ridley of a case of toxoplasmosis has since appeared in the *British Journal of Ophthalmology*, 1949, **33**, 397.)

Ophthalmology in Spain and Holland

Mr. JOHN FOSTER (Leeds) then spoke on practical ophthalmology in Spain and Holland in 1948. He had been greatly

impressed by the speed of certain operators in Spain and Holland. At several clinics he had found that the average time spent on diathermy for detached retina was less than five minutes, and once he had witnessed fifteen intracapsular cataract extractions in three-quarters of an hour. Such speed—when it was combined with care and dexterity, as it had been on those occasions—could be achieved only by an able operator supported by first-rate assistants working in a smoothly organized theatre. Another striking feature had been the wide discrepancy between different clinics with regard to operative asepsis. Some surgeons had favoured prolonged washing of hands and forearms before donning gown, cap, mask, and gloves. Others had cared for none of these things, and purists would perhaps be horrified to hear that statistics did not reveal any corresponding discrepancy in the post-operative infection rate.

SECTION OF OTO-RHINO-LARYNGOLOGY

Friday, July 1

Respiratory Obstruction in Children

With the president, Mr. A. B. PAVEY SMITH, in the chair, Mr. G. E. ARCHER (Manchester) read a paper on acute respiratory obstruction in infants and young children. He reviewed some of the causes of asphyxia neonatorum, suggesting how it might be avoided and how treated, and emphasized the desirability of having a trained endoscopist attached to every obstetric unit. Nasal respiration was the natural method, and essential in newborn infants. Nasal and postnasal obstruction could therefore cause severe dyspnoea. He stressed the importance of adenoid hypertrophy in the very young, and described acute nasopharyngeal tonsillitis as a clinical entity. He discussed laryngo-tracheitis and the differential diagnosis between it and laryngeal diphtheria. He then described and differentiated spasms of the larynx due to reflex irritation, inflammatory states, or other causes, referring specially to laryngismus stridulus, laryngitis stridulosa, and nocturnal dyspnoeic attacks in children, and he emphasized the importance of other conditions, such as laryngeal diphtheria, retropharyngeal abscess, thyroid and thymic disease, and foreign bodies.

Dr. MARY J. WILMERS (London) discussed the ways in which acute respiratory obstruction presented in infants and young children. She defined four clinical groups: (1) Sudden cessation of breathing without preceding distress, as seen in "breath-holding," laryngismus stridulus, and pertussis; (2) laryngeal distress and stridor, the commonest cause being laryngeal diphtheria, though other causes were trauma by instrumentation, as in bronchoscopy, and oedema secondary to scalds or caused by allergy; (3) attacks simulating asthma, due to obstruction of a main bronchus by foreign body or tuberculosis; (4) variable and intermittent stridors, which were absent during sleep or rest. That included congenital laryngeal stridor, and pressure on the trachea from without by an abnormal aortic arch, retrosternal goitre, enlarged thymus, and tuberculous mediastinal and paratracheal glands. It could also occur in cases of papillomata of the larynx and of catarrhal laryngitis.

Mr. J. H. OTTY (Bradford) emphasized how rarely the laryngologist saw the condition under discussion. In a 10-year period at Bradford at the Royal Eye and Ear and the Fever Hospitals only 27 patients required tracheotomy and 10 intubation. He agreed with Mr. Archer on the importance of adenoids, but thought that in infants much help could be obtained from the use of paraffin or ephedrine drops, and from multi-vitamin therapy. He rarely found it necessary to curette the adenoids before the age of 3 or 4 years. Acute retropharyngeal abscess was becoming very rare, and acute laryngeal obstruction by papillomata was extremely rare. He looked forward to the day when fever hospitals would become part of the general hospital system, so that endoscopists would be readily available to them.

Dr. E. C. BENN (Leeds) ascribed the unusual fall in the incidence of laryngeal diphtheria to the type of bacillus. The most important cause of mortality in tracheotomized diphtheria patients was toxaemia. Among the fevers measles now was the commonest cause of laryngeal obstruction. There was the group of varying and often uncertain aetiology, which included those cases of acute laryngo-tracheitis which Mr. Archer had described. He concluded by evaluating the three forms of interference available—aspiration, intubation, and tracheotomy.

In the discussion which followed Mr. A. S. DE B. COCKS (Adelaide, South Australia) condemned the use of metal instruments in treating cases of asphyxia neonatorum. He drew attention to the frequent cases of acute laryngo-tracheitis reported in Australia and to the almost complete disappearance of diphtheria in S. Australia. Dr. H. M. JAY (South Australia) described the epidemic of acute laryngo-tracheitis in more detail. All cases were thought at the time to be laryngeal diphtheria, and almost all were fatal from toxaemia. Mr. W. I. DAGGETT (London) strongly deprecated the use of endotracheal anaesthesia in infants.

Dr. J. F. BIRRELL (Edinburgh) stated that the commonest cause of death from respiratory obstruction in infants in the Sick Children's Hospital in Edinburgh was the inhalation of vomit. Treatment by bronchoscopic suction had succeeded in a few such cases. Congenital laryngeal paralysis with associated sensory changes was sometimes a cause. He advocated tracheotomy in cases of obstructing laryngeal papillomata, and favoured removal of adenoids, when necessary, in very small infants. Dr. S. DEBONO (Malta) described an epidemic of laryngo-tracheitis occurring in Malta last winter, and the treatment by direct laryngoscopy and aspiration, with the administration of streptomycin. Dr. A. P. M. PAGE (Nottingham) disagreed with giving carbon dioxide to babies. He thought the condition described by Mr. Archer should be called acute laryngo-tracheo-bronchitis, and that it was the extension into the bronchioles and not the toxaemia which killed. Palpation was important in the diagnosis of retropharyngeal abscess.

Mr. T. MCM. BOYLE (Leeds) asked if cases of pertussis developing stridor should be treated in the decompression chamber. Dr. H. STANLEY BANKS (London) thought that laryngo-tracheitis comprised two or more conditions, either of bacterial or of virus origin. Tracheotomy did not save these patients, nor did chemotherapy. Two fatal cases showed well-marked haemorrhagic pulmonary oedema. The decompression chamber was of no value in treating early pertussis and its complications.

Dr. W. M. JONES (Harrogate) said that most cases of asphyxia neonatorum were due to drugs and anaesthetics given to the mother. Mr. PAVEY SMITH, the president, agreed that tracheotomy in diphtheria was becoming ever rarer. He advocated intubation of the larynx by a gum-elastic catheter under direct vision as the first step in performing tracheotomy. Mr. ARCHER, in reply, agreed that tracheotomy in young infants was an exceedingly difficult operation. Anaesthetists should be trained to realize the possibility of damaging the delicate structures of the infant larynx. Laryngo-tracheo-bronchitis had been discussed at some length, but he had seen only four cases, two proving fatal; and in these the oedema present was tracheal and not laryngeal.

CLINICAL DEMONSTRATIONS

On the afternoons of June 30 and July 1 demonstrations were arranged at the Royal Bath Hospital. A large number of patients suffering from osteoarthritis, ankylosing spondylitis, and rheumatoid arthritis were shown in various stages of recovery following surgical procedures. Some of them were still bed cases, others were on crutches or could walk unassisted, some even entered the hall on bicycles, and so right up to apparent full recovery of function. Mr. H. PETTY (Leeds) was in charge of the demonstration, which was followed by a film. The physiotherapy regime for cases of cup arthroplasty was demonstrated. The patient was put on a Thomas splint with skin traction, and passive movements were instituted with the aid of a cord passing through pulleys and attached to the splint. The Thomas splint was taken off at the fourth week, a foot splint used, and the exercises continued. By the eighth week there was progress to crutches, and the patient was shown to be capable of performing certain special exercises.

Correspondence

Man and the Machine

SIR,—An alarming picture of the powers of endurance which may in the future be required of sufferers from heart disease is suggested by Dr. C. W. Curtis Bain's Presidential Address to the B.M.A. at Harrogate (July 2, p. 1). His clear historical review of the technical developments which have extended our understanding of the heart and circulation would perhaps have contributed even more to medical philosophy had he drawn a sharper distinction between devices employed in research and those calculated to have frequent and undisputed applications in clinical practice; had he reminded us more surely that among the most valuable results of the instrumental inquiries of Mackenzie and Lewis were the powers they conferred upon physicians to select and often to dispense with instruments. Symptom-analysis and history, a careful clinical examination not bringing undue disturbance to the patient, and an understanding of the "whole man" and his work and domestic and other circumstances will probably continue to outweigh in practical advantage (save in a very small minority of cases) all the elaborate tools of the bedside pathologist.

Of the countless patients seeking advice about their hearts, the great majority have no organic disease; nor do we generally require modern technical aids to decide this for them. Of the cases of organic disease or those remaining in a doubtful category, the great majority can still be adequately assessed for purposes of advice, treatment, and prognosis without recourse to other tools than the watch, the stethoscope, the sphygmomanometer, the thermometer, and the ophthalmoscope. The dangers for the future inherent in an over-mechanized medicine (which would be our own responsibility) may in fact be no less than those inherent in a too bureaucratic administration.

Dr. Curtis Bain reminds us that most of the new techniques come from Germany, the home of ultra-materialistic doctrines, or from America, where the rapid spread of specialization has not brought unmixed blessings to medical science and practice. In our own practice, and above all in our teaching, has not the time already come to consider seriously on every possible occasion—and alike from the point of view of the patient and of costs to the community—not how many tests might be employed in a given situation but which, if any, of them is necessary and a logical contribution to sound treatment? And should we not also be indulging in some very careful thinking about the ethics of bedside experiments, not always free from discomfort or risk, now often undertaken not so much for the benefit of the sick person as for the advancement of theoretical knowledge or even for fear of being considered behind the times? Professor Geoffrey Jefferson (June 25, p. 1105), while not decrying some other types and uses of machines, recommends that we should range ourselves with the humanists in studying man and his mind. In our approach to the problems of man and his heart our allegiance should surely not be otherwise. It would indeed be a grave setback to medicine, considered either as a science or service, if clinical specialists, bemused by a "multiplicity of tests," should cease to be physicians.—I am, etc.,

Oxford. JOHN A. RYLE.

Anopheles Eradication in Cyprus

SIR,—As the "investigator from the Ross Institute" concerned, may I rise to the fly that you cast in your issue of June 18 (in "Heard at Headquarters," *Supplement*, p. 339) to refute the charge made by Lord Winster that I imported an anopheline into Cyprus, reserving to myself the right to claim a share in the 100 litres of wine he expects to win over this business, as compensation for the attack?

The truth about my expedition was that I went to Cyprus in April, 1948, accompanied by an assistant, Miss W. J. Wall—our object being to inquire into the methods used in the anopheline eradication campaign, and particularly into the means whereby the results were checked and the reliability of the central records. As a part of this, a team of seven people, including Miss Wall, Mr. Aziz, and myself, carried out intensive searches for anophelines in a number of places throughout the island, the places being chosen by myself—in some cases at random and in some because eradication would be difficult in them. In this series of searches I made a thorough examination of 88 houses, cattle sheds, or other shelters for adult anophelines, and searched 425 "units" of water for larvae in 26 separate localities.

The campaign, which was described by Dr. Horace Shelley and Mr. Mehmed Aziz in the *Journal* of April 30 (p. 767), was carried out in three areas named the 1946, 1947, and 1948 areas, work having only just started in the 1948 area at the time of our visit. We caught one adult anopheline mosquito, *Anopheles multicolor*, female, in Asomatos village on April 9. This village was in the 1948 area, which had not been claimed as clear, and this is my sole record of an anopheline capture. The triumph of the visit was that this specimen fell to my own gun.

Miss Wall stayed in Cyprus for about six weeks after I had left, making thorough examinations of 14 villages in the areas claimed to be cleared, the villages being selected by myself beforehand. She examined 837 premises for adult anophelines and approximately 1,000 units of water for larvae—all without success. In addition, she examined 232 blood films from children born since the area in which they lived had been claimed as cleared of anophelines. All were negative.

In presenting the conclusions of my visit, I said, "I am convinced that the checking techniques used are as reliable as any that could be devised, and that they are carried out on an extremely wide scale with a firm determination to discover any residual anophelines. The results of my inquiry confirm entirely the records maintained in the central office, which I therefore accept as absolutely reliable." I forecast success to the scheme, saying that I expected a few records of anophelines in 1949, mainly of *A. bifurcatus* with a possible occasional record of *A. superpictus*, and complete freedom from anophelines in subsequent years unless reinvasion occurs. History so far suggests my forecast was unduly pessimistic.

The importance of this campaign cannot be over-estimated. It is the first attempt to eradicate an entire genus of insects, and widespread indigenous ones at that, from a large territory. The need for it has been demonstrated in malaria surveys with records of high spleen rates and much morbidity. The meaning of malaria to the people is illustrated by the name of the village in which my capture was made. Asomatos, Greek for "without substance," is the name of a miserable, poverty-stricken, decrepit village, inhabited by a fever-ridden people unable to cultivate properly the magnificent alluvial soil on which they live owing to the disease from which they constantly suffer. The campaign, over-modestly described by Shelley and Aziz, is one of the most outstanding achievements of our present time.—I am, etc.,

London, W.C.1. G. MACDONALD.

Prophylaxis of Goitre

SIR,—Some years ago the Medical Research Council appointed a subcommittee to investigate this subject and make recommendations. In 1944 they published an interim report in the *Lancet*[1]—that is about 5½ years ago. Quite recently the full report[2] has appeared. The number of cases of thyroid enlargement in England and Wales was estimated to be 500,000 in persons of the age of 5 to 20 inclusive. In the words of the M.R.C. report, "Prophylaxis with iodized salt can be accepted as the most simple and effective measure of control," and the subcommittee "strongly urge the adoption of the national policy of adding a trace of iodine to all common salt consumed in the country. The proportion recommended is one part of potassium iodide to 100,000 parts of common salt."

When a body composed of the most suitable men for such an examination makes a specific recommendation of this kind one would expect some notice to be taken of it. Here we have in this country well over half a million people suffering from this disfiguring affection of the neck when there need not be any. All who have had any experience assert that of all diseases goitre is the most easy to prevent. Most people, including doctors, believe that where there is no goitre there

is no iodine deficiency. They do not know that the enlargement does not occur until the normal amount of iodine which should be present in the gland has been reduced by 75%. That means that a person may have a deficiency of 60%, 50%, or less without any evidence in the neck. Very few people get all the iodine they require to maintain perfect health, fertility, and normal development in their offspring. Is it not time a practical measure like this was put into operation in this country?—I am, etc.,

JAMES A. GOODFELLOW.

Chesterfield.

REFERENCES

1 *Lancet*, 1944, 1, 107.
2 Medical Research Council Memorandum No. 18, 1948, London.

Mind, Machine, and Man

SIR,—There is apparently no question that electric automatic computing machines can be made to play a legally correct game of chess. As Weiner says, it is essentially no more difficult than the construction of an interlocking railway signalling system. A real problem, as Professor M. H. A. Newman indicates (June 25, p. 1133), is whether such machines can play a "good" game. Weiner and others have indicated that this could be achieved by assigning values to a sequence of a given number of moves ahead in such a way that to checkmate receives the highest valuation, to be checkmated the lowest, and intermediate situations would have intermediate values. The machine would then "play over" to itself all its own legal moves and all the opponent's legal ripostes, and would stop only when it had found the move which gave the maximum valuation at the prescribed number of stages ahead. If the machine was correctly instructed about "value," and could examine all possible situations up to say three moves ahead, it might play "good" chess in the sense that it would checkmate the average player.

Professor Geoffrey Jefferson (June 25, p. 1105) states that "not until a machine can write a sonnet . . . because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain." But, clearly, if a machine could play a "good" game of chess in the above manner, a machine exactly similar in principle but considerably more complicated could, with no apparent hesitation, write a "good" sonnet when it had an appropriate "feeling." A poet, we will say, finds himself in an unusual and quite indefinable state of contentment, and is profoundly affected by the view before him. He is impelled to translate his total feeling about the situation into a sequence of words. He ceases when he finds a particular sequence which satisfies him, and the poem is judged by us to be a good poem according to standards of our own.

A machine, to duplicate the poet's behaviour, would need on the afferent side a visual perception apparatus, and some device which indicated the state of stability of the whole mechanism. For example, its operating voltages will, through no fault of its own, be subject to very slow random fluctuations, and a device could be conceived which would indicate some quality of these fluctuations, analogous to the poet's unusual feeling of contentment—it might for example be made to indicate whenever these fluctuations had been less than their average for a period of three days. The machine would need a storage system for a few thousand words and some teletype effector system.

All that is now needed is to give it its instructions as to "value." The first set of instructions would assign a separate value to all possible visual patterns on a scale which would perhaps assign highest marks to those representing Rita Hayworth in the Alps, and lowest marks to a Japanese soldier in Shoreditch. The second set of instructions would ensure that when a visual pattern of unusually high assigned value is present simultaneously with a state of unusual stability the machine would have no alternative but to organize its word store into a poem. For this it would be necessary to have a third set of instructions which would assign a value to all possible word sequences. The extent to which this set of values was itself influenced by the particular visual pattern and by the conventions of grammar and syntax would determine the extent to which the final poem would resemble those of Wordsworth or Ezra Pound. Perusal of an "Anthology of Bad Verse" suggests that stylistic inconsistency should perhaps receive a lower valuation than nonsense. The machine would also require additional sets of instructions assigning values to various quantities of words and constructional forms. The machine would then proceed to play over to itself all possible permutations and combinations of its few thousand words, and it would stop only when it had reached that particular set of words which its instructions have determined shall be valued highest. If, in the end, its operator does not agree that the machine has produced a fine poem, he has made an error somewhere in the values he has given it.

It is thus not totally inconceivable to imagine a machine which will look at a view, and, if it is in the mood, be compelled to write a poem about it, and after some short delay type out, without error, a masterpiece. The typewriting monkeys will in time produce *Hamlet*, but these machines are by no means typewriting monkeys if their overall activity can be controlled by the process of assigning values to their operations. For example, if electronic impulses were made to represent words, Professor Jefferson "cannot see that anything but jargon would result." But the net result of these instructions could be that all tendency to jargon utterance was suppressed, and only non-jargon resulted.

The crux of the matter appears to be that the class of computing machines at present available could, if sufficiently elaborated, produce what we should judge to be a masterpiece equivalent to *Hamlet* with far less wasteful effector effort than the typewriting monkeys. Discussions of whether such machines "feel" simply reduce to verbal definitions. The fact that we have not a poet but a man-made poetry machine which might well have a volume of a few cubic miles and need millions of man hours to prepare its instructions is irrelevant to the point. Professor Newman says that "the first question which will have to be asked is, Can *anything* that can be called thought be imitated by machines, and, if so, how much?" This question again seems too much bound up with verbal definitions to be satisfactory.

These machines have indicated to us a way in which a fundamental gain in efficiency could be made over the typewriting monkey, but to a biologist at first glance a mechanism as described above seems of a fundamentally less efficient class than that which exists for the same purpose in the brain. The behaviour of living protoplasm involves principles—for example, of growth and organization—to which there are no mechanical or electrical analogues, and, as Professor Jefferson indicated, it is absurd to imagine that the cerebrum functions without calling on them. There seems nevertheless to be a tendency at the moment for biologists and others to react as if some unwanted electrical gadget was being sold to them. It would, however, seem appropriate to acknowledge that the progress that is now being made in the science of the classification of mechanisms may ultimately have a liberating influence on biology akin to that brought about by Darwin.—I am, etc.,

J. A. V. BATES.

London, W.C.1.

Partial Gastrectomy for Peptic Ulcer

SIR,—The article by Mr. John Hosford on certain aspects of partial gastrectomy for peptic ulcer (May 28, p. 929) deserves comment. He has compared the results of resections with retrocolic gastro-jejunostomies, as well as gastro-jejunostomies with a valve and gastro-jejunostomies without a valve. Mr. Hosford has classified the results as excellent, satisfactory, and bad, but has not reported the incidence of anastomotic ulcer or early postprandrial distress (the dumping syndrome).

It is well established that the small intestine demonstrates a gradient of susceptibility to injury by acid-pepsin extending from the upper to the lower portions. The use of a retrocolic anastomosis has been advocated on the basis of this evidence, since a shorter, and hence less ulcer-susceptible, afferent jejunal loop can be used. The comparison of retrocolic and antecolic anastomoses should be made on the basis of the incidence of anastomotic ulcers.

On the other hand, the Hoffmeister type of anastomosis has been particularly advocated to prevent the dumping syndrome.

Only a small portion of the cut end of the stomach is used to make the gastro-jejunostomy, the remainder of the cut end being closed to form a valve. Some feel that the incidence of the dumping syndrome should be less when such a valve is present than when the entire cut end of the stomach is used for the gastro-jejunostomy (Polya type). In evaluating resection and gastro-jejunostomy with a valve or without a valve, this should be done on the basis of the incidence of postprandial distress.

Unfortunately Mr. Hosford's report does not answer the important questions in regard to retrocolic and antecolic gastro-jejunostomies and gastro-jejunostomies with a valve or without a valve.—I am, etc.,

Chicago. DAVID C. FAINER.

Chlorosis

SIR,—It would appear that chlorosis, in the form described first by Lange in 1520 as *De Morbo Virgeneo*, is of sufficient rarity now to warrant the recording of the following case. The last report of this syndrome in British literature would appear to be that of Dunkerley (*British Medical Journal*, 1936, **2**, 71).

A girl aged 19, a shop assistant, attended the medical out-patients' department of the Royal Surrey County Hospital on Aug. 21, 1948, complaining of swelling of the ankles and shortness of breath for the past three months. The menses were irregular. The appetite had recently become poor; there were no definite dislikes. On examination, the patient was a pale, plump girl with marked greenish-yellow pallor, showing several areas of definite greenish pigmentation on the forehead and malar regions. There was slight oedema of ankles. No other abnormality was found.

Blood count: red cells 2,350,000; white cells 6,300; haemoglobin 25% (Haldane); colour index 0.5; mean corpuscular diameter 6.6–7.2 μ; packed cell volume 18%. Differential white cell count: polymorphs 33%, lymphocytes 65%, monocytes 2%. Film: marked degree of hypochromia, anisocytosis, and poikilocytosis; predominance of lymphocyte series; no early nucleated cells found. Sternal puncture: normal differential count. Test meal: acid curves within normal limits. Urine: no abnormal constituents. As treatment, iron and ammonium citrate 30 gr. (2 g.) and ascorbic acid 50 mg. were given three times a day. The patient made an uninterrupted recovery on the above therapy, and on Dec. 31, 1948, her haemoglobin was 90% (Haldane) and red blood cells 4,950,000. She had lost her marked greenish coloration and now had a pinkish complexion.

This case reveals most of the features of chlorosis as seen and described by physicians earlier in this century, when it was believed to be due to poor ventilation and deficient diet.

I wish to thank Dr. J. H. Cobb for permission to report this case.

—I am, etc.,

Guildford, Surrey. JANE M. FULLERTON.

Research in Renal Disease

SIR,—I should like strongly to endorse the views put forward by Dr. A. A. Osman (May 21, p. 910) on the importance and urgency of training a sufficient number of competent nephrologists and of providing them with the necessary facilities for their work.

I write not only as a doctor but as a patient, for I am the victim of a disabling form of renal disease by reason of which, though in the prime of life, I have been totally incapacitated for the past five years. In these circumstances, though I cordially agree with everything that has been written in this correspondence regarding the importance of research in renal disease, I am not unnaturally more immediately interested in the application of current knowledge to the problems of the patient.

Dr. Osman does not overstate the case when he points out that too many patients receive little more than cursory attention. My own experience of this aspect of the question has been bitter indeed, for I have every reason for believing that had my illness had expert handling in the earlier stages I should now be a fit man. It was bungled because those responsible were brought up in the complacent tradition that the investigation and treatment of renal disease can be taken in his stride by any general physician.

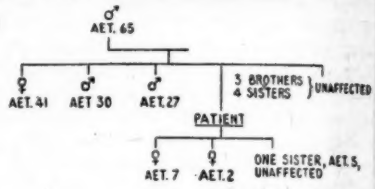
I now know better, but I have had to pay a heavy price to gain this knowledge. Moreover, since I perforce became "kidney conscious" many other tragedies of a like kind have come to my knowledge. It is in the hope that others may avoid a similar fate that I venture to obtrude these personal reflections upon the attention of your readers, in supporting the demand that certainly exists among discerning patients for more specialization in this branch of medicine.—I am, etc.,

INVALID.

Epidermolysis Bullosa

SIR,—I should like to illustrate Dr. Parkes Weber's letter (June 4, p. 1007) by quoting a case of epidermolysis bullosa which I saw in the Middle East during the war.

The patient, aged 39, was a driver in the R.A.S.C. who complained of recurrent blistering of the feet and ankles "all his life." On examination, both his feet showed evidence of ruptured bullae, which were situated on the plantar surfaces and underneath the toes. There were some old scars on the ankle regions and on the left foot; one large unbroken bulla was seen near the head of the first metatarsal. There was some thickening of the skin in the region of the heels, under which collections of fluid were seen. There were no striking changes present in nails or toes. The photograph shows some of the lesions on the left foot.



A most interesting family history was given. The family tree shows how the condition affected three generations (only the feet in each case).—I am, etc.,

Nottingham. H. LEE.

Diagnostic Tests for Phaeochromocytoma

SIR,—In the interesting article with a report of a case of bilateral phaeochromocytoma by Mr. T. M. Reid and Dr. R. Salm (June 25, p. 1116) and in the annotation (p. 1131) functional tests for this tumour are discussed. Histamine and acetyl-β-methylcholine-chloride (stimulating a paroxysm of hypertension), and the anti-adrenaline compounds benzodioxane and dibenamine (causing a drop in blood pressure), were mentioned. Yet another test might perhaps be of interest. LaDue, Murison, and Pack[1] have tried in a case of phaeochromocytoma, which was successfully removed, tetraethylammonium bromide and found it more satisfactory than histamine diphosphate, as the rise in the blood pressure could be controlled by a change in the patient's posture (tilting table or bed).

Tetraethylammonium bromide does not inhibit the action of adrenaline; it acts by blocking transmission of nerve impulses to the autonomic ganglia, and in normal individuals 0.2–0.5 g. of this drug will produce a fall of blood pressure. In the case mentioned above hyperpiesia was observed after intravenous injection of 400 mg. of tetraethylammonium bromide, with a rise in the blood pressure within 30 seconds from 175 mm. Hg systolic and 105 mm. diastolic to 270 mm. systolic and 160 mm. diastolic. The raised pressure lasted 15 minutes. On change of posture from supine to standing erect the blood pressure was brought down from 230/125 mm. to 95/80 mm. A direct stimulating effect on the tumour cells by the drug appears to be unlikely in view of the rapidity with which the blood pressure rises after its intravenous administration.

The tumour which was removed weighed 298 g. and contained 8 g. of adrenaline in 200 g. of tumour tissue—equivalent to 8 litres of 1:1,000 solution of adrenaline. Ninety-eight grammes were fluid and contained 100 mg. of adrenaline. The concentration of adrenaline was equal to 4% of tissue by weight.—I am, etc.,

Northampton. B. JOLLES.

REFERENCE

1 *Ann. intern. Med.*, 1948, **29**, 914.

Abortions and Psychoneurosis

SIR,—The letters from Mr. Aleck Bourne and Dr. Paul R. Saville (July 2, p. 31) are timely and important. This problem is one which is increasing and will continue to do so unless we can find some practical criterion which will safeguard the interests of patient, psychiatrist, and gynaecologist.

In general it is justifiable to terminate pregnancy if its continuation seriously threatens or endangers the health, mental or physical, of the mother. When a mental illness is adduced as justification for terminating pregnancy the motives involved must always be suspect. The only exception to this is where the patient is clearly certifiable. The vast majority are not—they are in a state of anxiety and depression, and usually threaten suicide unless the alleged cause, the pregnancy, is terminated. Although these patients are certainly mentally ill, they are to be viewed with suspicion, because in such an illness one retains a degree of choice as to the course of the symptoms which is not present in organic conditions.

I think there is one very good criterion of the genuineness and sincerity of the patient's mental distress in such cases. Ask the patient if she is willing to undergo treatment for the mental illness as a voluntary patient in a mental hospital. The genuine depressives who want at all costs some treatment for their anguish will consent, albeit reluctantly, and it may then be left to the hospital authorities to decide whether termination is an essential part of the treatment. The hysterics (and they are many), and those whose symptoms are being consciously or unconsciously exaggerated in order at all costs to get rid of the pregnancy, will usually not be willing. In fact, the immediate reaction of the patient when this course of action is proposed is pathognomonic and enables one to separate the sheep from the goats with a good deal of assurance.

The Lunacy and Mental Treatment Acts are designed to safeguard the interests of the mentally ill. I think a good deal of trouble and anxiety would be saved if doctors would apply them in these cases. If a patient has attempted suicide there should be little difficulty. Such a patient is *ipso facto* "unable to manage herself or her affairs or a danger to herself or others," and the proper place for her is a mental hospital, either voluntarily or under certificate. The threat of suicide, which in these cases is very like a pistol pointed at the doctor's head, is similar. When the criterion I have suggested is adopted, those with strongly motivated mental symptoms usually hasten to assure one that "they don't really mean it seriously." My experience in these cases is that this is so and that they do not in fact attempt suicide.

As a psychiatrist I am not infrequently being faced with this problem. This is as it should be, and a psychiatrist is the correct specialist to advise if specialist opinion is thought necessary. So far as my experience goes, Dr. Saville need not fear that the procedure can only be carried out by paying impossible fees. The gynaecologists with whom I have worked have all preferred, and mostly insisted on, carrying out the procedure in hospital and not in a nursing-home. Admission to hospital, either a mental hospital or a psychiatric bed in a general ward, has other advantages, too. A decision in any doubtful case can be reached much better after a period of observation in hospital than at a single psychiatric consultation, besides being, as I have tried to show, a good diagnostic test.

By adopting this criterion one is able to do one's best for the patient, which is the first and most important consideration. I feel, too, very strongly that such a yardstick also enables one to safeguard the highest professional standards. This, too, is important, for it would be idle to pretend that there are not some patients who are willing to pay almost anything to have an abortion recommended and carried out.

To summarize, I would agree entirely with the last paragraph of Mr. Bourne's letter. The cases of mental disturbance where termination of pregnancy is indicated are uncommon.—I am, etc.,

Manchester. E. HOWARD KITCHING.

SIR,—Mr. Aleck Bourne's letter (July 2, p. 31), while enhancing his reputation as a gynaecological surgeon, does very little indeed to make us respect his knowledge of psychiatry, whether on the psychopathological level or on the level of administration. Only those who have dealt with suicides can realize how humanly impossible it is to prevent a determined patient from carrying out her intention. By the same token, only the psychotherapist knows, and fully understands, that an illegitimate pregnancy merely provides the occasion for the self-destructive tendency.

Mr. Bourne's somewhat airy way of talking about modern methods in the treatment of depressive states needs toning down. To administer convulsive therapy to a woman pregnant with an unwanted child would constitute one of those tragi-farcical procedures only too common in the professional lives of our mechanistically minded practitioners of to-day; to the more humane psychiatrist it is unthinkable.—I am, etc.,

Kingswinford, Staffs. WM. A. O'CONNOR.

SIR,—Mr. Aleck Bourne's letter (July 2, p. 31) raises many important points with regard to induction of premature labour or therapeutic abortion in the prophylaxis or treatment of psychoneurosis during pregnancy. The vast majority of unmarried, and a considerable number of married, women who find themselves pregnant against their will, though anxious to have the pregnancy terminated, afford no legal indication for interference. But where the gynaecologist suspects an underlying psychological instability, on the basis of which the pregnancy is causing a grave psychoneurosis with the likelihood of suicide or psychosis, interference may be justified.

Where it is possible to obtain a report from the patient's usual medical adviser, who has a knowledge of her past psychological history, this should afford valuable guidance; and careful examination by one or more psychiatrists of standing, to determine her present condition, should both help the gynaecologist to make a decision and protect him from any suspicion of unjustified interference. Many such patients need psychotherapy *after* interruption, though many of them cannot or will not undergo it.

The patient, or her relations, should always be warned that no surgical operation—not even the removal of tonsils or of an ingrowing toenail—is completely devoid of danger. But interruption, by a skilled and experienced operator, with a skilled anaesthetist, is relatively safe. It is impossible to procure reliable statistics on this point, but I have seen only one fatality in 34 years.

Mr. Bourne's letter contains two errors. He assumes that only "a few millilitres of a mildly irritant paste" is injected. The manufacturers of the paste recommend from 10 to 30 cubic centimetres. In induction of premature labour as much as 40 or 50 cubic centimetres are sometimes used. In 19 years' experience of this technique I have never until the present case seen any sign of shock. He refers to one "alleged" attempt at self-destruction. The patient's mother informed the psychiatrist, and repeated on oath at the inquest, that her daughter had taken an overdose of "adalin" and had turned on the gas in an attempt at suicide.

Dr. P. R. Saville (July 2, p. 31) is unduly pessimistic about the treatment of such cases at public hospitals. Much, of course, depends on the individual views of the psychologists and gynaecologists at the hospital; but in a number of cases which I have referred to public hospitals for consideration of interruption the operation has been carried out. Some psychiatrists decline to recommend, and some gynaecologists decline to carry out, interruption, both in private practice and at public hospitals, even in cases where they believe it to be indicated, because they are afraid that they may be suspected of improper practice by colleagues who do not know the details of the cases. Fears of this sort are more likely to be met with in hospital practice, since at a hospital all members of the staff know what operations are undertaken there.

The present situation with regard to therapeutic interruption of pregnancy is far from satisfactory for medical practitioners, since it offers opportunities for abuse by the unscrupulous and at the same time exposes the most scrupulous to the suspicion of malpractice. But it is easier to find fault with the present position than to suggest satisfactory alterations.—I am, etc.,

London, W.1. NORMAN HAIRE.

Obituary

Dr. H. Bruce Low writes: As an intimate friend of HENRY ANSTEY COOKSON may I add a few words to the tributes already paid to him (June 11, p. 1055)? Cookson was richly endowed and had unusually varied opportunities for gaining experience. He was pathologist to a busy provincial hospital, and material from other hospitals in a thickly populated industrial area was sent to him; all of which made him claim to be essentially a clinical pathologist. But he became also an expert in forensic medicine, and coroners' and judicial courts relied to an increasing extent on his investigations and testimony. His attainments were recognized by his colleagues in Edinburgh admitting him without examination as a member of the Royal College of Physicians and later promoting him a Fellow. His scientific standing was acknowledged by his election as a Fellow of the Royal Society of Edinburgh.

Cookson's interests were wide. He was equally at home in discussing moths and butterflies, gannets on the Bass Rock, palaeolithic prehistory, the internal workings of a motor-car, the intellectual and cultural qualifications of bishops, or, it seemed, anything and everything. He had shrewd, wise, and provocative opinions readily expressed on any subject that happened to be mooted. He was prepared to say what districts of the country motorists had passed through by an examination of the insects adhering to their windscreens. With no parade of piety, he had definite religious convictions. He cared not whether a man was Episcopalian or Presbyterian, but he disdained any who were devoid of religious principles. Pride of race and in his country's achievements were a portion of the deeper parts of his character.

But among his friends this man, affectionately known as "Cookie," will be remembered chiefly for his boyish impishness and fun. To be in his company was a delightful entertainment. A humorous remark quickly broke through the reserve of strangers, and a picture comes to my mind of the learned scientist, sitting on his luggage in the corridor of a wartime crowded train, taking his part with a group of passengers in reading a play which a hitherto unknown fellow-traveller happened to have in his bag, the whole performance promoting hilarious enjoyment on an otherwise tedious journey. Be his desk never so high with work waiting to be done, he followed you out of his office, along the passage, down the stairs and to the outer door, firing off quips, jests, and leg-pulls that made the escape of the willing victim difficult. With all his learning and bonhomie, there was a surprising tenderness and depth of feeling for any who were in trouble. His imagination readily put him into the predicament of the unfortunate one and he was apt with sympathy and proffered help. The world of his acquaintances is left sad and impoverished by the loss of this remarkable and lovable man.

Dr. ALISTER FORBES COWAN died at his home in Lincoln on June 9 at the age of 62. For the past two or three years he had been handicapped by illness but had carried on his practice with characteristic pluck. Born in Edinburgh, he was educated at Merchiston Castle School and at Edinburgh University, where he graduated M.B., Ch.B. in 1912. He took the F.R.C.S.Ed. in 1923. After holding resident appointments as house-surgeon in the Royal Infirmary, Edinburgh, and as senior house-surgeon at the Royal Sussex County Hospital, Brighton, he joined the late Dr. F. J. Paley in practice in Hove. He served in the first world war as a captain, R.A.M.C., and subsequently migrated to New Zealand, where for some years he practised at Akaroa and had charge of the hospital there. Always interested in gynaecology, Cowan decided to specialize in this subject and moved to Wellington, but unfortunately he was soon incapacitated by illness. After his recovery he settled in Lincoln, where he practised for the rest of a busy life. Alister Cowan's buoyant and enthusiastic temperament carried him through all difficulties, and his sunny nature made him many staunch friends. He was a fine quarter-miler in his young days, and he loved every kind of sport, especially shooting, golfing, and fishing. To his widow and two surviving children, one an officer in the Gurkhas, the sympathy of all his colleagues and friends will be extended. —H. N. F.

Dr. LAURENCE SEBASTIAN MORGAN, of Grenada, British West Indies, died at Virginia Water, Surrey, on June 9, aged 67 years. He was the elder brother of Dr. H. B. W. Morgan, M.P. for Rochdale. He qualified later in life than usual, and after short service in the R.A.M.C. in the 1914–18 war (from which he was invalided) he returned to the Caribbean area and joined the Colonial Service. He was stationed for the remainder of his life in the Colony of Grenada and its satellite islands, and did at different periods many malarial surveys for the Government. He was secretary, and later president, of the Grenada branch of the B.M.A. Finally he acted as chief medical officer, medical officers of prisons, and principal medical officer of the asylum and quarantine station until his resignation. He was buried in Highgate Cemetery, London, after a service at the Dominican Church, Southampton Road, Hampstead.

Dr. CHARLES MORTON GAVIN ELLIOTT died suddenly on June 10 at the age of 68. He was born in Geraldton, Western Australia, and educated at St. Peter's College, Adelaide. He started work in a shipping firm, but gave this up to study medicine at Edinburgh. He took the Scottish triple qualification in 1914, and was a house-surgeon at the Royal Infirmary, Edinburgh. Afterwards he worked as an assistant to Dr. Ronald of Larbert. On the outbreak of war in 1914 he joined the R.A.M.C., and served in France for four years. He was twice mentioned in dispatches. After the war he returned to Edinburgh to take his D.P.H. in 1919, and later settled in practice in the High Street, Old Portsmouth. He built up an extensive practice, especially with Service families, and continued with his work until shortly before his death. During the recent war Dr. Elliott carried on under difficult conditions, for his house and surgery were destroyed by enemy action. A sound physician, he never spared himself in his devotion to the highest ideals of his profession and to the welfare and comfort of his patients. His qualities won him the respect and affection of all classes. He married Alison Jones, of Larbert, in 1919, and she survives him with a daughter and two sons.

Mr. HYMAN BARNETT LIEBERMAN, who died in Nottingham on June 25 at the early age of 46, was born in Sydney, Australia. He graduated M.B., Ch.M. at the University of Sydney in 1926. He then came to this country, and was appointed house-surgeon to the late Mr. A. R. Tweedie and Mr. H. Bell Tawse at the General Hospital, Nottingham. He had a natural ability for ear, nose, and throat surgery and soon decided to make this his life work. He took the D.L.O. in 1930 and the F.R.C.S.Ed. in 1932. After gaining these higher qualifications he was appointed honorary aural surgeon to the Mansfield and District Hospital, and clinical assistant to the General Hospital, Nottingham. In 1936 he was appointed honorary assistant surgeon at the General Hospital, Nottingham, and throughout the war years, following the death of Mr. Tawse, he was in charge of the ear, nose, and throat department. Long hours of work with a depleted staff, and little leisure, undoubtedly contributed to his early death, for he never spared himself in his service to his patients. After the war he retired from the Mansfield and District Hospital in order to concentrate his work at the General Hospital, Nottingham, where he was appointed to the full staff in 1947. He always had a hankering to go back to Australia. In 1948 he resigned his appointments and travelled to Perth, where he intended to continue the practice of his specialty, but anxiety about the health of his children led to his early return to Nottingham. Not long after this his own health broke down; his death from pneumonia was unexpected and tragic. It could be said of Lieberman that he had three interests—his family, to whom he was devoted, music (he was an accomplished pianist), and his work. The esteem in which he was held by his colleagues and his patients was an indication of the character and value of his services.—G. G.

Dr. GEORGE THOMAS WILLAN, a well-known Hove practitioner, died suddenly at his home on June 24 at the age of 74. Dr. Willan received his medical education at Cambridge and Guy's Hospital, taking his B.A. in 1898 and the conjoint diploma in 1891. In his early days he was especially interested in industrial medicine, and wrote several articles for *Pitman's Dictionary of Industrial Medicine*, including those on the medical examination of employees, factory health, and factory records and statistics. During the South African war he was attached to the 17th Lancers as a civil surgeon. In the 1914–18 war he commanded the 82nd Field Ambulance in the 27th Division from 1915 to 1918. He served in Belgium, France, and Macedonia, and in 1917 was awarded the D.S.O. and mentioned in dispatches. He was invalided from Salonika in 1917. Dr. Willan practised in Carlisle and later in Milton Regis and Sittingbourne before settling in Hove. He had given valuable service to many organizations, including the South African Veterans, the R.A.M.C. Association, the Ypres League, and the St. John Ambulance Brigade. In 1935 he held the office of president of the Border Counties Branch of the B.M.A. During the recent war he was in charge of a camp reception station in Brighton. Dr. Willan was a good all-round sportsman, and enjoyed a regular dip in the sea up to the last. He is survived by his widow, one son, and two daughters. The profession in Hove has lost a fine representative of the old type of general practitioner, who will be much missed not only by his many friends and patients but also by his colleagues, with whom for many years he had worked in steady friendship. He was a good comrade who could always be relied on for help when needed.—L. A. P.

Dr. JOHN GALWEY LEEBODY, medical superintendent of Fulham Hospital and formerly medical superintendent of St. George-in-the-East Hospital, died in Hammersmith Hospital on July 2 at the early age of 49. Although he had been in indifferent health for some time, his death came as a great shock to his many friends. Leebody was born in Edinburgh, educated at Merchiston, and graduated M.B., B.Ch. at Edinburgh in 1923. He obtained the F.R.C.S.Ed. in 1936. Most of his professional life was spent in the municipal hospital service. He was a capable surgeon, but of recent years had devoted more and more time to medical administration. At work he was conscientious to a fault, never sparing himself and doing everything he could for his patients and for the East End Hospital he loved. The hospital building was badly damaged during the war, and the anxiety of these years was no doubt an added strain on his health. Leebody was a man of high integrity and infinite charm who endeared himself to all who knew him. He was an ideal companion, quick with the happy phrase that neatly sized up a personality or a situation. In sport he was an all-rounder, though his activities in this field had necessarily been curtailed of late. The deep sense of loss felt by his colleagues will also be shared by the many nurses who worked with him. He is survived by his widow and a young son, to whom the sympathy of many friends will be extended.—J. R. M. W.

Medico-Legal

A STILL LONGER GESTATION PERIOD

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

Where divorce suits have been founded wholly or chiefly on abnormal length of gestation the Divorce Court has accepted as possible periods of gestation 346 days in 1947 and 349 days in 1948.[1] Mr. Commissioner Blanco White, recently retrying a petition previously heard at Chester in December, 1947, would not reject 360 days.[2] A leading aircraftman serving in Germany had home leave from Aug. 7 to 17, 1945, and was demobilized on Feb. 9, 1946. Between those dates he had no access to his wife, but on Aug. 13, 1946, she bore a child which weighed 8¼ lb. and was apparently normal in every way. This meant a gestation period of either 186 days or 360 days. The wife, so far as the evidence showed, was a respectable and hardworking woman with a small child who lived with her parents. She worked as an assistant linesman on the railway. No allegation of misconduct was made against her. In November and December, 1945, about nine months before the birth, she wrote to her mother-in-law and husband as if with a clear conscience, and when it took place she notified him by telegram and by letter.

The Commissioner was satisfied on the medical evidence that the child could not have been conceived as late as 186 days before the birth, but on the question whether the 360 days' gestation was possible he had to ask himself whether the extra 14 days over the period of 346 days previously accepted by the courts was such as to tip the balance between a reasonable and a fantastic doubt, for adultery has to be proved beyond reasonable doubt. He did not think it right to condemn this respectable woman, who had sworn that she had not committed misconduct, on speculation alone. He could not say, on the court's judicial knowledge of natural laws, that 360 days was an impossible period, and so was not satisfied beyond reasonable doubt that adultery had been committed.

An appeal has now been entered in this case.

[1] *Wood* v. *Wood*; *Hadlum* v. *Hadlum*.
[2] *Daily Telegraph*, March 25, 1949.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The following candidates have been approved at the examination indicated:

FINAL M.B.—*Part II (Principles and Practice of Physic, Pathology, and Pharmacology):* J. Armstrong, G. K. Barker, A. Bates, P. E. Bodkin, I. I. Bornstein, E. C. A. Bott, J. F. Boyle, B. I. Brown, P. Bryan-Brown, D. Bulmer, J. F. C. Callow, N. I. Cardno, C. C. Clapham, E. A. Cooper, P. B. Corston, G. A. Court, P. J. Crossland-Taylor, W. G. Dawson, R. D. Eagland, J. G. Elliott, M. A. Epstein, R. W. Fairhead, E. H. R. Ford, P. R. Freeman, A. Gol, D. Gough, G. A. Gresham, B. M. Grimmett, E. C. B. Hall Craggs, J. R. Harris, E. H. Hemsted, R. N. T. Higgins, B. J. Hockey, L. B. Hunt, L. C. Hurst, I. P. James, E. W. P. Jones, M. J. Kehoe, D. S. Kerr, H. P. Kilner, A. J. Lane, D. G. A. Leggett, D. W. L. Leslie, H. P. Lottenberg, J. Lynfield, J. P. Lythgoe, C. McCance, I. R. McWhinney, T. C. K. Marr, J. D. Marsh, E. Monkhouse, W. P. L. Morrison, J. H. Neame, H. R. Odlum, B. W. Peckett, P. T. Perkins, S. T. H. H. Pilbeam, K. N. J. Pocock, A. Polak, H. T. Pym, J. H. Rack, J. M. Roberts, C. A. Rogerson, J. B. Self, V. H. Smith, J. F. Soothill, L. R. Spencer, J. Stevens, T. E. Stockley, R. A. Struthers, T. J. Sullivan, M. K. Sykes, D. G. Thompson, P. W. Thompson, E. Veldhuyzen, D. P. Wagstaff, C. B. Walker, I. S. Waller, S. A. Wartski, J. F. Watkins, R. G. Watkinson, E. J. Watson-Williams, D. D. Webb, E. K. Westlake, J. L. Whitby, B. F. Whitehead, M. Wilkinson.

UNIVERSITY OF ST. ANDREWS

The following candidates have been approved at the examinations indicated:

M.D.—Elizabeth M. Ford, D. Myles, D. Thomson.

M.B., Ch.B.—W. G. F. Adams, O. R. Akinshete, Anne Astley, T. S. Beveridge, S. C. Cameron, R. E. Candlin, P. G. Cannon, Jean E. H. Charlton, Elizabeth M. Chester, J. J. Christ, Denys P. L. Cooper, J. A. Doig, D. W. Emuchay, Denys V. I. Fairweather, Eileen R. Forrest, J. L. Galloway, D. G. Garrow, C. W. Grant, P. W. Grant, Sheila C. Grant, J. D. Green, W. Guthrie, J. B. W. Halley, F. T. Hardy, Margaret M. A. Harley, W. A. Henderson, P. M. Joubert, Margaret M. Kennedy, G. Kerr, A. S. Liddell, A. S. Lindsay, Doreen S. Lowson, Anthea L. MacBean, Mary E. McGavin, J. A. McGregor, A. D. McInness, A. M. McLeod, Margaret G. Macnaughton, R. A. Main, Pamela A. Mais, Muriel I. K. Nicoll, Isabella G. R. Nimmo, Joan North, Margaret Oliver, Evelyn J. Paterson, Joan E. Perry, I. R. Purdom, I. H. Redhead, A. W. Robertson, Monica V. Robinson, M. Rosen, J. N. Rushforth, A. Saddler, J. Simpson, Isobel M. Smith, A. W. Sumner, G. Williams, Janina Zaborowska.

UNIVERSITY OF LONDON

The following members of the medical profession have been appointed representatives of the University on the governing bodies of the institutions indicated in parentheses: Professor S. J. Cowell

and Professor E. M. Killick (King's College of Household and Social Science); Mr. J. B. Hunter (Royal Free Hospital School of Medicine); Dr. C. E. Newman (West London Hospital Medical School); Professor Ian Aird (Hammersmith, West London, and St. Mark's Hospitals); Professor J. D. Boyd (Imperial College of Science and Technology). The following members of the medical profession have been reappointed as representatives of the University on the Councils of the Medical Schools indicated in parentheses: Dr. D. H. Brinton (Charing Cross Hospital Medical School); Sir Herbert Lightfoot Eason (Guy's Hospital Medical School); Mr. M. F. Nicholls and Professor Samson Wright (Royal Dental Hospital of London, School of Dental Surgery); Professor A. B. Appleton and Mr. E. G. Slesinger (St. George's Hospital Medical School); Sir William Gilliatt (St. Mary's Hospital Medical School); Air Vice-Marshal Sir David Munro and Professor T. B. Johnston (St. Thomas's Hospital Medical School); Sir Archibald Gray and Professor J. M. Mackintosh (University College Hospital Medical School).

The following have been recognized as teachers of the University in the subjects indicated in parentheses: *London Hospital Medical College*, Dr. M. Weatherall (Pharmacology); *Guy's Hospital Medical School*, R. E. Rix, M.R.C.S., L.R.C.P., F.D.S., and F. S. Warner, M.R.C.S., L.R.C.P., F.D.S. (Dental Surgery); *St. Thomas's Hospital Medical School*, Dr. H. J. Anderson (Medicine) and Mr. R. W. Nevin (Surgery); *Royal Free Hospital School of Medicine*, Dr. Ursula James (Children's Diseases), Dr. Sybil G. Mocatta (Gynaecology), and Miss Jocelyn A. M. Moore (Obstetrics and Gynaecology); *Postgraduate Medical School of London*, Dr. I. Doniach (Pathology); *Institute of Psychiatry*, Dr. W. C. M. Scott (Mental Diseases (Psychiatry)).

Frank Cunliffe Ormerod, M.D., F.R.C.S. has been appointed to the University Chair of Laryngology and Otology tenable at the Institute of Laryngology and Otology, from Oct. 1.

The following candidates have been approved at the examination indicated:

ACADEMIC POSTGRADUATE DIPLOMA IN MEDICAL RADIOLOGY (DIAGNOSIS).—*Part I:* M. J. Lochrin, J. McN. Lockie, Joan M. T. MacCarthy.

The following scholarships have been awarded for 1949–50 by the Royal Free Hospital School of Medicine: *Mrs. George M. Smith Scholarship*, Miss M. Y. K. Armstrong (Woking County Grammar School for Girls); *Mabel Sharman-Crawford Scholarship*, Miss K. M. Barber (Lewes County Grammar School for Girls); *MacIntyre Evans Scholarship*, Miss J. T. Bryant (Royal Free Hospital School of Medicine); *Dr. Margaret Todd Scholarship*, Miss R. W. Shannon (Royal Free Hospital School of Medicine); *A. M. Bird Scholarship for Clinical Studies*, Miss V. Rose (Royal Free Hospital School of Medicine).

The following candidates at the London School of Hygiene and Tropical Medicine have been approved at the examination indicated:

ACADEMIC POSTGRADUATE DIPLOMA IN BACTERIOLOGY.—D. R. Christie, L. S. Grant, J. Gulasekharam, N. P. Gupta, F. L. Jackson, L. A. Little, Kamala P. Roe, J. Shrivastav, J. C. N. Westwood.

UNIVERSITY OF MANCHESTER

Raymond Whitehead, D.Sc., M.D., has been appointed Reader in Pathology and Stanley Clucas Gawne, M.D., D.P.H., D.C.H., Lecturer in Public Health Administration.

UNIVERSITY OF SHEFFIELD

M. W. A. Gatman, M.B., Ch.B., has been appointed Lecturer in Medical Pathology.

Dr. J. W. Perrott and Dr. J. F. Goodwin have resigned the posts of Demonstrator in Anatomy and Research Fellow and Tutor in Therapeutics respectively.

QUEEN'S UNIVERSITY OF BELFAST

The following candidates have been approved at the examinations indicated:

M.D.—*In Medicine:* *H. Brewster, *J. D. Cromie, *A. C. Houston, *C. Kirk, *W. T. Warmington. *In Pathology:* R. A. Neely.

M.B., B.Ch., B.A.O.—A. F. Adedoyin, G. W. Black, R. Bolton, A. N. Bradford, P. D. A. Burns, Jane M. Caldwell, F. W. Charles, B. N. Christie, A. N. Dempsey, W. Fullerton, J. C. Gilmore, W. C. Green, A. T. Heron, L. H. King, Margaret A. Lynas, Yvonne A. B. McArdle, Elizabeth P. McKay, P. B. McKeown, Mary A. O. Moffatt, W. Moore, Betty Morrow, J. S. Neison, Frances A. Pope, G. Rutledge, S. Shaffner, W. Sinclair, T. W. Sloan, Jeannie Stewart, J. Tohill, M. Tweedie, W. Warnock, J. Wilson, Mary C. Wilson.

*With commendation.

UNIVERSITY OF BRISTOL

The following candidates have been approved at the examinations indicated:

M.D.—A. F. Rogers.

FINAL M.B., Ch.B.—[1] [2]D. M. Gambier, [1] [3]June M. Smith, [2]Joan H. Barnes, B. B. Beeson, D. J. Brain, Joan K. Cheeseman, Jennifer M. Comely, P. C. Farrant, Elizabeth M. Fraser, Patricia M. Gilbert, Pamela M. Hellings, Sybil E. Jacob, C. D. Linton, J. P. Martin, Elizabeth M. Morgan, June Morgan, P. A. Normandale, J. S. R. R. Old, H. Schnieden, [4]J. D. Sheward, Medora Storkey, M. P. Walker, G. Walters, Olwen J. West, Catherine C. White. *In Group I only (Medicine, Public Health, and Forensic Medicine):* Pamela Hawkins.

DIPLOMA IN PSYCHOLOGICAL MEDICINE *(Part II)*.—I. M. Davies, I. A. Macdonald.

DIPLOMA IN MEDICAL RADIOTHERAPY *(Part II)*.—K. Lal, H. H. Robinson.

DIPLOMA IN PUBLIC HEALTH *(Part II)*.—K. G. Bergin, Peggy Beynon, D. W. Browne, J. E. Krzywiec, J. D. Medhurst.

[1]With second-class honours. [2]With distinction in public health. [3]With distinction in obstetrics. [4]With distinction in medicine.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

On July 7 Mr. A. Dickson Wright, Sir Stanford Cade, and Mr. Digby Chamberlain were elected members of the Council of the College. The result of the poll was as follows:

	Votes
Elected	
Digby Chamberlain (General Infirmary at Leeds) ..	726
Sir Stanford Cade (Westminster Hospital)	632
Arthur Dickson Wright (St. Mary's Hospital) ..	556
Not elected	
Eric William Riches (Middlesex Hospital)	500
Rodney Honor Maingot (Royal Free Hospital) ..	434
Thomas Twistington Higgins (Hospital for Sick Children)	427
Harold Clifford Edwards (King's College Hospital) ..	406
Harold William Rodgers (Royal Victoria Hospital, Belfast)	361
Alan Cecil Perry (London Hospital)	315
Arthur John Gardham (University College Hospital)..	229

In all 1,791 Fellows voted; in addition 12 votes were found to be invalid.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

On July 1 Violet K. St. G. Breaky was admitted to the Fellowship, and Maureen Murphy and J. Eustace (*in absentia*) were admitted to the Membership of the College.

ROYAL COLLEGE OF SURGEONS IN IRELAND

The following have received the Fellowship of the College: M. P. Ashe, C. J. Gilligan, G. A. McL. Lee, A. C. V. Maltby, J. B. Prendiville.

CONJOINT BOARD OF IRELAND

The following candidates have received the diplomas of L.R.C.P. and S.I.: M. J. Banahan, T. G. Behan, J. Beirne, S. Brennan, P. Brodbin, Mary Collins, Marian D'Arcy, W. J. Donnelly, Margaret Dormer, M. Duffy, F. G. Fennell, Sheila P. D. Jones, D. W. Leahy, Maire Lynch, P. J. Mooney, J. G. Moran, P. J. A. Moriarty, D. K. Mullen, B. J. McCartie, Isabel M. McCullough, R. C. Nzeribe, K. J. O'Brien, Mary A. O'Callaghan, C. O'Connor, H. O'Donnell, S. J. O'Rourke, H. J. O'Toole, Rosemary V. Styles, J. D. Sullivan, W. Twibill, L. A. Wells, M. J. J. Cusack.

The Services

The Efficiency Decoration of the Territorial Army has been conferred upon Major (Acting Colonel) R. W. Nevin and Major T. MacGregor-Gibson, R.A.M.C., T.A.

R.A.F. MEDICAL AND DENTAL BRANCHES' DINNER

The annual dinner of past and present medical and dental officers of the Royal Air Force will be held at Dorchester Hotel, Park Lane, London, W., on Friday, Dec. 2. The price of tickets, which are limited in number, is £2 10s. inclusive, and early application should be made to Squadron Leader G. R. Gunn, Air Ministry (M.A.2), Awdry House, Kingsway, London, W.C.2.

Medical Notes in Parliament

NATIONAL HEALTH SERVICE (AMENDMENT) BILL

Consideration of the National Health Service (Amendment) Bill was continued in a Standing Committee of the House of Commons on July 5. The Bill was printed in full in the *Supplement* of May 21 (p. 274), and the first two sittings of the Standing Committee on June 28 and 29 were reported in the *Journal* of July 9 (p. 102).

Mr. BING moved a new Clause intended to remove doubts about the duties of local health authorities in connexion with midwifery.

"(1) It is hereby declared for the removal of doubts that the duty of a local health authority under subsection (2) of section twenty-three of the Act of 1946 to secure that the number of certified midwives who are available in the authority's area for attendance on women in their homes as midwives, or as maternity nurses during childbirth and from time to time thereafter during a period not less than the lying-in period as there defined, is adequate for the needs of the area includes a duty to secure that the midwives so available as aforesaid are enabled to render all services reasonably necessary for the proper care of the women upon whom they so attend.

"(2) It is hereby declared for the removal of doubts that the duty of a local health authority under subsection (2) of section twenty-three of the Act of 1947 to make adequate arrangements for the provision to women, by whom or on whose behalf application was made, of the services in their homes of certified midwives before and during childbirth and from time to time thereafter during a period not less than the lying-in period as therein defined includes a duty to secure that the midwives whose services are so provided are enabled to render all services reasonably necessary for the appropriate care of the women upon whom they so attend."

Mr. Bing said the object of the Clause was to remove doubts that the Minister could not provide all services reasonably necessary for the proper care of women attended by midwives. The Clause was drawn to include all the powers of the Minister in the midwifery services and not merely powers dealing with analgesia. He himself did not see how the doubts had arisen, but they had been raised and consequently the new Clause had been drafted.

Mr. BEVAN said he had never at any time believed that the language of the Act left any doubt of the powers of the Minister. Long before such doubts were cast the Minister had exercised those powers and the local authorities were accepting the position. In accepting the Clause he did not do so because he thought the words were necessary, but to remove doubt from the mind of the doubters.

Mr. WALTER ELLIOT said the Opposition was grateful to Mr. Bevan, and the Clause was then read a second time.

Mrs. LEAH MANNING then moved to insert in it the words: "including in particular the administration of analgesia." She said she knew the Minister would press this service on local authorities, but in her experience of education schemes she had seen matters dropped which it was without doubt in the power of the Minister to have included. While the Clause went a long way, she did not think that "reasonable care" could be said to include analgesia.

Mr. BING said the provision of a maternity service was not a matter of writing words into Acts of Parliament but of providing local authorities with money. In moving a similar amendment to the Bill on Second Reading, Mr. Thorneycroft had made reckless charges against hospitals under the National Health Service. The Speaker had then ruled that a case of complaint by a patient which Mr. Thorneycroft had raised was a matter to be discussed in Committee. The only instance Mr. Thorneycroft had given had been based on a reckless disregard for the facts.

The Chairman pointed out that the new Clause dealt with attendance on women in their homes and not in hospitals.

Mr. BING said the amendment was an effort to write into the Bill a reference to a campaign during which attacks had been made against both the domiciliary and the hospital services.

Mrs. MANNING said it was unfair and dishonest for Mr. Bing to continue to make these attacks.

Mr. BING pointed out that in legislation any words added by way of explanation narrowed the scope of the general words that preceded them. It would be a grave mistake if the Committee were to narrow the scope of the general words in this Clause.

Mr. THORNEYCROFT said it was no part of his case to attack Mr. Bevan or the Health Service. He pointed out that in Section 22 of the National Health Service Act there was a provision that every local authority should arrange for the care, "including in particular dental care," of expectant and nursing mothers and of children. No one had suggested that the inclusion of the words "dental care" meant that one could only look after the teeth of mothers and children and nothing else. Similarly the inclusion in the Bill of the words "in particular the administration of analgesia" would not prevent the continuation of all other forms of midwifery service.

Mr. BEVAN said the amendment did not impose a duty on anybody. All the Clause did was to make it clear that the Minister had the right to insist on the local authority carrying out schemes under Part III powers, and that in requiring them to do so he should call on them to have regard in particular to the administration of analgesia.

Duty to Provide Analgesia

Mr. THORNEYCROFT said that counsel had advised that no clear and specific duty to provide analgesia had been imposed on local health authorities under the National Health Service Act, 1946. He doubted whether the words "necessary services" were wide enough to include the provision of analgesia. The view of the Government Front Bench was that there was no real necessity for this particular form of service. He pointed out that in some Scottish counties and burghs not a single gas-and-air apparatus was available. Glasgow, with over 6,000 births which had been attended only by a midwife, had not a single gas-and-air machine and had not even one on order. Figures supplied by the Scottish Office showed that in 1948 there were 27,000 births in Scotland attended only by midwives and only 800 of these women had analgesia. As the law stood there was no duty to provide analgesia through domiciliary midwives and no obligation on the Minister. The Secretary of State for Scotland had said that even if he had the power he would not issue orders to local health authorities. He had justified the shortage of equipment for analgesia in Aberdeen on the ground that the authorities there were waiting for better apparatus to turn up. That was not good enough.

Mrs. JEAN MANN pointed out that the Central Midwives Board had imposed an obligation on all midwives in training that they must take training in analgesia. She thought that members should be content with that and content with the Minister's assurance that it was obligatory on all midwives to have the training. She quoted the opinion of Dr. J. E. Elam, anaesthetist to the Wellhouse Hospital, Barnet, that if analgesia was to be successfully given in domiciliary midwifery a second midwife should be present. She thought that before they compelled local authorities to spend money on analgesia equipment they should see that the apparatus was not of a kind which next year would be thrown into the junk yard.

Clinical Knowledge

Mr. BEVAN said that the discussion showed how unwise it was to write into a statute anything relating to the exercise of clinical knowledge. For Mr. Thorneycroft the matter had become a monomania. Mr. Thorneycroft was no longer concerned about the mother, but only with the language of the statute. The amendment would not relieve any pain. It was a piece of political impudence for Mr. Thorneycroft and other Conservatives with their record of complete neglect for the mothers of Great Britain and their absolute failure to do anything about analgesia for years to have the cheek to argue in the face of the statistics which the Government had produced, showing the changes which had occurred within a few months of the introduction of the Health Services. Mr. Bevan claimed that he had provided not only for analgesia to be given, but by the equalization of rates he had found the money to enable the poorer local authorities to carry out the service. The words of

the amendment would be fulfilled if a local authority provided one apparatus. What Mr. Thorneycroft wanted was a stunt and not analgesia.

It was for the clinician to decide what it was best to give the mother and for the Minister to put into the hands of the midwife or the doctor the full range of clinical services which might be necessary. It was not the duty of laymen like Mr. Thorneycroft to say what should be clinically applied in a given set of circumstances. There were other ways of inducing painless birth which were not analgesia. Why did not members of the Opposition move an amendment to provide that streptomycin should be given in all cases of tuberculous meningitis? They could go through the whole range of clinical medicine and insist on each case being mentioned in a Bill. Each piece of clinical practice was a part of the general Health Service. It was the duty of the Minister to put at the disposal of the medical profession the full range of medical apparatus and then to leave the medical profession to apply it in the light of changing experience. In six months or a year this practice might be entirely dated and they would have an Act of Parliament insisting on the administration of an out-dated practice. If Mr. Thorneycroft was better acquainted with the subject he would know that some obstetricians and gynaecologists objected to this form of birth. In this field Parliament must give proper attention to the welfare of the Service as a whole and the health of the patients in particular. It would be sheer idleness to accept the amendment, because the words would mean nothing. Parliament ought not to single out any special form of treatment. It had done so under the principal Act with regard to dental priorities and Members could see what had happened.

Dr. GUEST pointed out that the new Clause included a duty on the local health authorities to secure that the midwives whose services were provided were enabled to render "all services reasonably necessary for the appropriate care" of the women they attended. Surely that provision included analgesia and everything else.

Mr. BEVAN agreed that these words covered the whole range of services which at any moment might be regarded as clinically necessary—not only analgesia but all services.

The Committee then divided and Mrs. Manning's amendment was rejected by 16 votes to 15. Mr. Bing's clause as originally proposed was then added to the Bill.

On the Schedule covering minor amendments of the Acts of 1946 and 1947 Mr. BEVAN moved to insert words to enable the Exchequer grant to be paid on the money which local health authorities had to find to make good the annual deficit of the Central Midwives Board. The Committee agreed to the amendment.

An amendment by Dr. SEGAL to add representatives of ophthalmic and dispensing opticians to the local representative committee was withdrawn when Mr. Bevan agreed in principle to accept it at the report stage.

Drugs for Private Patients

Mr. RICHARD LAW moved to insert words to enable patients who were treated by private practitioners and not under the National Health Service to receive the advantages of the Act so far as pharmaceutical services were concerned. There was a very strong feeling among private patients that they were being unfairly treated.

Consideration of this amendment was adjourned until the Committee resumed for a fourth sitting.

When the Committee resumed on July 6 Mr. BEVAN replied to Mr. Law, whose amendment proposed that a doctor, who treated a private patient could prescribe drugs, medicines, and appliances, which would be provided under the National Health Service. He said that if this were allowed there would be no effective check on expenditure. It was a mistake to say that the Ministry could make regulations to provide for a doctor who was outside the Service being brought inside for disciplinary purposes in this respect. The patients of private doctors were not denied the services provided under the Act: they denied themselves. Probably less than 4% of the population still chose to have private doctors. A large number of doctors in the Service had private patients as well. He saw no reason why they should not have, if they wished to maintain the relationship of private doctor and private patient which had formerly existed, but he saw no reason why Parliament should pump out public money to support the proposition moved by Mr. Law.

The National Health Service (Amendment) Bill afforded unlimited scope for the Opposition to put down amendments to the National Health Service Act, yet the only substantial amendment proposed was this one which added to the expenditure without adding to the Service. A doctor wishing to retain a private patient might be induced to prescribe expensive drugs because the more he satisfied that patient that he was prescribing astronomically the more inclined the patient would be to keep him as a private doctor. Until the Service had stabilized itself Parliament ought not to do anything that would bring about a return to the old situation.

Sir HUGH LUCAS-TOOTH asked Mr. Bevan whether he would accept an amendment which would enable doctors who were in the Service to prescribe for their private patients.

Mr. BEVAN said the fact that a doctor treated a person privately put both of them outside the Service in respect of that treatment.

Sir HUGH LUCAS-TOOTH pointed out that a doctor could prescribe for a visiting patient or for a foreigner.

Mr. BEVAN said the Opposition could have put down an amendment to deal with the problem and exclude foreigners, but all it wished to do was to create bitterness and prejudice without facing the problem. If visitors to this country fell sick they took advantage, as a general rule, of the hospital system, but that was no reason why the Committee should make a general breach in the system.

Sir HUGH LUCAS-TOOTH said that a person could go to a doctor as a private patient and at the same time be placed on the list of some other doctor under the scheme and take advantage of that fact to obtain medicines recommended for him by his private doctor.

Dr. HADEN GUEST said that was not the way that medical practice worked. If it took place it would be regarded as a very serious matter by both doctors. The majority of doctors in the Service were men of the highest integrity. Some forms of treatment were very expensive. It might be necessary to prescribe for patients gland extracts at a cost of £100 per week. To suggest that such treatment should be outside the control of the National Health Service was fantastic. Doctors would resent having to send in two kinds of accounts and would prefer to deal with the matter from a National Health Service point of view. From the doctor's point of view the advantage of the Service was that it got rid of commercialism.

Colonel STODDART-SCOTT drew a comparison between a British subject who paid his taxes and his contributions to the Health Service but could not get that service, while a foreigner was able to get any treatment under the Health Service without being on the list of any doctor.

Dr. SEGAL hoped that Mr. Bevan would set his face against the amendment. He believed that the present glut of overprescribing was a relic of the bad old days. The tendency would diminish as the Service developed. He did not see how Mr. Bevan could make a concession which would add to the opportunities for overprescribing.

Mr. LAW said Mr. Bevan had been unreasonable in arguing that the change proposed was not administratively possible, and unreasonable in arguing that it was a dodge to endow private practitioners with public funds.

Mr. BEVAN said that if a citizen contributed to the upkeep of a park which he never entered he suffered no injustice, because the park was not withheld from him. It was not true that the Government was withholding from a British private citizen what it was giving to a foreigner. Old age pensioners and also wives and children did not pay the contribution and were still entitled to the medical service. If he made the concession which had been asked for, the 4% of population outside the Service would grow very rapidly.

Mr. LAW's proposed amendment to the schedule was then rejected by 20 to 7.

An amendment by Mr. HOWARD to provide for compensation for "loss of remunerative time" by individuals attending hospital management committees or other bodies in place of

the provision in the Bill for compensation for "any loss of earnings" was withdrawn after Mr. BEVAN had given an assurance that the phrase used in the Bill involved no narrowing of the provision.

Election of Chairmen

Colonel STODDART-SCOTT moved an amendment the purpose of which was to provide that the Minister, having nominated every member of every regional hospital board and every member of every board of governors of teaching hospitals, should permit them to elect their own chairmen from among the people he had appointed. The amendment also asked that management committees should be allowed to choose their own chairmen.

Mr. BING said that the power which the Minister possessed enabled him to make appointments of a semi-political nature which it would be difficult for the regional boards themselves to make.

Mr. BEVAN remarked that of all his tasks in connexion with the National Health Service the appointment of boards of governors and their chairmen and of regional hospital boards and their chairmen had been one of the most difficult. He did not seem to have been able to please anyone, but he was consoled by the fact that the regional boards and the boards of governors were settling down quite happily to their tasks. Nothing could be more undemocratic than to permit a body of nominated persons to elect a chairman and thereby to stop the House of Commons from criticizing the Minister for the administration of these boards. The Executive Council was not an agent of the Minister but a statutory and contractual body, and therefore it was proper for it to elect its own chairman.

The amendment was withdrawn.

Mr. BEVAN moved an amendment authorizing him to pay certain expenses to members of subcommittees of the Executive Council. The Committee agreed to this amendment and to further drafting amendments, and the Committee Stage ended.

The Lock Hospital

Sir HUGH LUCAS-TOOTH asked Mr. Bevan on July 7 whether he had considered the proposal of the Regional Hospital Board that the London Lock Hospital should cease to be used as a hospital for the treatment of venereal diseases; and whether such action had received his approval or sanction.

Mr. BEVAN said this proposal had not been before him officially, because the Regional Hospital Board's delegated powers for the planning and development of hospital services in their area did not require them to obtain his approval before they made changes in the use of particular hospitals. If representations were made to him that a hospital ought not to be diverted from or to a particular purpose he would take these representations into account.

Dr. STEPHEN TAYLOR said the Regional Hospital Board had given most careful and sympathetic consideration to the case of the Lock Hospital. Only after the matter had been carefully discussed for a long time did the Board reach this decision.

Mr. BEVAN said it was undesirable that regional boards should be interfered with in their detailed plans.

Analgesia in Childbirth Bill

A Standing Committee of the House of Commons resumed on June 28 consideration of the Analgesia in Childbirth Bill.

Mr. J. J. ROBERTSON said that the Government proposed in committee on the National Health Service (Amendment) Bill to accept in principle new clauses standing in the name of Mr. Bing and Mrs. Mann. Mr. Bevan and Mr. Woodburn took the view that under the National Health Service Act local health authorities could be required to make provision for the supply of apparatus, for transport, and for the training of midwives in the use of analgesia. The domiciliary midwifery service was part of the National Health Service, and the provision of analgesia for women confined at home should not be divorced from other care given by domiciliary midwives to their patients. It would be wrong to single out analgesic apparatus and transport but not to secure that midwives were provided with other equipment and drugs required for the efficient practice of their calling.

Mr. THORNEYCROFT said that those who proposed to make specific provision for analgesia were not the first people to single out something in the National Health Service Acts. The Ministry had placed specific duties on local health authorities. The Government had made it a duty and not the option of the local health authority to arrange for the care of mothers and children under the age of 5. He had no doubt that if the Bill passed there would be a greater use of analgesia. The machines were available and were piled up in the stockrooms of the manufacturers.

Dr. HADEN GUEST said it would be better that action should be taken on an amendment to the National Health Service (Amendment) Bill to confer not only the power to make use of analgesia but power to do everything else necessary to make motherhood safe, to diminish maternal mortality, and to diminish the fear of pain. He thought that in future the psychological and physical preparation of a woman for childbirth would be more important than it was now. Safer motherhood depended on a big and elaborate organization. They had had that organization in London for some time and it could be set up in other places.

Mr. THORNEYCROFT said that if the Government was prepared to put a specific duty on local authorities in respect of the supply of drugs, apparatus, and transport he was prepared to drop the Analgesia in Childbirth Bill.

Mr. BLENKINSOP, for the Government, said Ministers wished to make the position clear by accepting words ensuring that the Minister had power to impose a duty on local authorities over the whole range of the services and not merely for analgesia. After further discussion the proposal that Clause 2 stand part of the Bill was defeated by 21 to 13. Subsequent clauses were accepted with minor amendments. The Bill was then reported to the House.

On July 1 the Bill was considered as amended in Standing Committee, and Mr. THORNEYCROFT offered to accept several amendments proposed by Mr. Bing. Discussion of these continued till the time appointed for the rising of the House, and the Bill did not then receive a third reading.

On July 8 the third reading of the Bill was moved and was rejected by 108 to 44.

Beryllium Poisoning.—Mr. JAMES GRIFFITHS said on June 28 that beryllium poisoning had been added to the list of prescribed industrial diseases. He was also considering a recommendation about certain forms of cancer among nickel workers.

Sickness Benefit.—Mr. TOM STEELE stated on July 7 that it was estimated that about 800,000 persons were in receipt of sickness benefit on June 1, 1949. A statistical inquiry into the average duration of sickness in 1949 was being made, but the results would not be available until early next year.

Extravagant Prescriptions.—Mr. PETER FREEMAN on July 7 asked the Minister of Health whether he knew that much larger quantities of medicines were frequently supplied on National Health Service prescriptions than were necessary, and what steps were being taken to prevent such waste of public money. Mr. BEVAN said a doctor whose prescriptions suggested extravagance might have his prescribing investigated by a local professional committee. Before this he would be given the opportunity of explaining his reasons to, and being advised by, one of the Ministry of Health medical officers.

Health Centres.—Mr. BEVAN announced on July 7 that 26 existing clinics were being run as health centres, medical or dental. One important new scheme was under way, and three other proposals were being considered. Meanwhile a special committee of the Central Health Services Council had the whole subject of future development in view.

The Ministry of Health reports that nearly 26,000 new blood donors were enrolled in the first three months of 1949, bringing the number of donors in the National Blood Transfusion Service to approximately 375,000. During the quarter there were 106,766 blood donations—23,000 more than in the comparable period last year. To keep ahead of the steadily increasing demand of hospitals, and to avoid, where possible, calling on the individual donor more often than twice a year, it is estimated that another 200,000 donors will be required.

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended June 25. [No. 25

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1949					1948 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	26	3	16	2	—	34	1	17	4	1
Deaths		—	—				—	2		
Diphtheria	73	17	24	6	5	137	17	44	6	1
Deaths	2	1	—	—	1	3	—	—	—	—
Dysentery	66	7	43	—	—	64	10	39	1	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	—	—	—	—	—	—	—	—
Deaths		—					—			
Erysipelas			18	3	3			21	9	1
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				39					46	
Deaths	17	1	4	—	—	33	1	11	2	—
Measles*	6,863	613	301	200	153	10,571	880	165	144	66
Deaths†			1	—	—			—	—	—
Ophthalmia neonatorum	52	4	10	—	—	47	9	11	—	—
Deaths										
Paratyphoid fever	31	1	—	—	—	8	1	2(B)	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	334	25	3	10	4	373	19	1	14	—
Deaths (from influenza)‡	7	—	1	—	—	4	—	—	1	—
Pneumonia, primary			153	25				142	26	
Deaths	111	17		9	4	114	14		4	4
Polio-encephalitis, acute	4	—				4	1			
Deaths										
Poliomyelitis, acute	48	6	2	3	—	27	7	2	1	—
Deaths§	3	1				—	—			
Puerperal fever		—	6				2	12		—
Deaths										
Puerperal pyrexia‖	88	3	3	1	—	109	13	5	—	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,137	76	175	68	57	1,649	103	394	40	36
Deaths†			—	—	—			1	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	8	2	2	1	—	3	—	3	1	—
Deaths	—	—	—	—	—	1	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	2,181	90	57	87	82	2,803	217	38	86	12
Deaths	8	2	—	1	—	2	—	1	2	3
Deaths (0–1 year)	216	25	38	18	11	256	40	46	17	8
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,183	616	561	154	116	4,018	615	586	151	137
Annual death rate (per 1,000 persons living)			11·3	9·5				11·8	9·4	
Live births	7,666	1197	1010	425	251	7,743	1246	1015	448	246
Annual rate per 1,000 persons living			20·3	26·3				20·5	28·0	
Stillbirths	193	26	29			241	35	26		
Rate per 1,000 total births (including stillborn)			28					25		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales and Eire.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

Notifications in England and Wales in the week ended July 2 were poliomyelitis 80 (48), polio-encephalitis 1 (4). (Figures for the previous week are shown in parentheses.) Counting poliomyelitis and polio-encephalitis together, multiple cases were reported from the following counties: Cheshire 2 (1), Cornwall 9 (3), Devon 4 (3), Essex 3 (5), Gloucester 3 (2), Hertford 3 (1), Kent 2 (2), Lancashire 5 (5), Leicestershire 2 (1), London 6 (6), Middlesex 9 (3), Oxford 4 (2), Somerset 2 (1), Yorkshire East Riding 2 (0), Yorkshire West Riding 9 (4), Carmarthen 2 (0).

The general epidemiological picture is one of a widespread increase, but the only definite groupings of cases so far reported have been in Newhaven (last case reported June 17), Camborne-Redruth U.D. (last reported case July 8), and Camberwell (last reported case July 7). A feature of the outbreaks has been the occurrence of unusual numbers of multiple cases in families. There have been three instances of two cases in one family, in Camberwell in two instances and in Newhaven in one instance. Cases have occurred among children rather than adults.

Many clinicians believe that muscular activity in the early indefinite stages of the disease is harmful, and Ritchie Russell brought forward evidence on this point based on his questioning of 100 patients who had poliomyelitis in 1947 (*Journal*, 1947, 2, 1023). His conclusion was that "complete physical rest in bed from the onset of the pre-paralytic stage greatly reduces the danger of severe paralysis. Severe physical activity at this stage is almost suicidal, while the continuance of even average physical activity is dangerous." This point was mentioned in the Ministry of Health memorandum published in the *Journal* of July 26, 1947 (p. 141), but did not perhaps then receive the emphasis which should now be given to it.

Food Poisoning at a London Hospital

Over a hundred members of the staff and patients at a large London hospital were affected by an outbreak of food poisoning on July 5. *S. typhi murium* has been isolated from a number of those attacked. There is little doubt that the vehicle of infection was "queen of pudding," eaten by some 600 persons at lunch on that day. This pudding was made in two stages. First breadcrumbs were mixed with a custard made from milk and the yolks of 200 duck eggs, and baked in the oven for about half an hour. The white of the eggs was then beaten up with sugar and poured on to the top of the sponge and grilled until the surface was lightly browned.

No members of the kitchen staff had had any suspicious illness before the outbreak, and it can be assumed that infection originated from the duck eggs. It is possible that parts even of the sponge which had been baked in the oven for half an hour may not have reached sterilizing temperatures; but it is certain that the heat treatment given to the white of the eggs was not sufficient to kill the organisms in this part of the pudding.

This outbreak, together with other recent incidents in which duck eggs have been involved, is a further reminder of the potential danger of consuming duck eggs without adequate heat treatment. Furthermore, unless the origin of the egg is known and it is certain that they are not infected with *S. typhi murium*, it is dangerous to use duck eggs in the preparation of meringue.

Discussion of Table

In *England and Wales* there was a decrease in the notifications of measles 2,289, acute pneumonia 92, and whooping-cough 72. The only increase was in the incidence of scarlet fever 207.

The largest declines in the incidence of measles were London 295, Warwickshire 254, Yorkshire West Riding 254, Kent 136, Sussex 131, Surrey 122, Middlesex 111, and Northumberland 108.

There were only small changes in the notifications of whooping-cough, notably an increase of 31 in Essex and a decrease of 55 in Lancashire. An increased incidence of scarlet

fever was reported throughout the country; notifications increased appreciably in Yorkshire West Riding 42 and Warwickshire 34.

The 73 notifications of diphtheria represented a new low record, which was eight less than the previous lowest return. The chief feature of the returns for diphtheria was the rise in London from 10 to 17, due mainly to an outbreak in Bermondsey with 10 notifications.

A further 28 cases of paratyphoid were notified from the outbreak in Durham (Hebburn U.D. 17; Jarrow M.B. 7). Notifications of dysentery from the outbreak in Lancashire, Liverpool C.B., numbered 32, which was six more than in the preceding week.

In *Scotland* decreases were recorded in the notifications of measles 118, whooping-cough 44, and scarlet fever 21, with a rise of 14 in the incidence of dysentery. This increase in dysentery was due to the experience of Glasgow, where the notifications increased from 18 to 31.

In *Eire* there were falls in the notifications of measles 59, whooping-cough 13, and scarlet fever 6. In contrast to the general trend a rise of 17 in the notifications of measles was reported from Dublin C.B.

In *Northern Ireland* there was an increase of 21 in the notifications of measles. This increase was confined to two counties—Antrim 10 and Armagh 12.

Week Ending July 2

Notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,031, whooping-cough 2,260, diphtheria 80, measles 6,984, acute pneumonia 376, cerebrospinal fever 23, acute poliomyelitis 80, dysentery 49, paratyphoid 13, and typhoid 4.

Medical News

Twelfth British Congress of Obstetrics and Gynaecology

A dinner was held in the Guildhall on July 8 at the conclusion of the Twelfth British Congress of Obstetrics and Gynaecology. Sir Eardley Holland, president of the Congress, was in the chair, and the guests included the Archbishop of Canterbury, the Lord Mayor, and Lord Webb-Johnson. Sir William Gilliatt, president of the Royal College of Obstetricians and Gynaecologists, in proposing a toast to the Lord Mayor, spoke of the connexions between the City and the Royal Colleges and the close association of the present Lord Mayor with St. Bartholomew's Hospital. The Lord Mayor replied, and welcomed the visitors from overseas to the City. Dr. J. V. Meigs proposed "The Congress," to which Sir Eardley Holland responded. Mr. Victor Bonney proposed a toast to "The Guests," who, he said, represented over 20 countries. Dr. Claud Béclère (Paris) and Professor Ebbe Brandstrup (Copenhagen) replied. Professor Hilda Lloyd proposed a toast to Sir Eardley and Lady Holland.

World Federation for Mental Health

At a Press conference held in London on July 7, Dr. J. R. Rees, president of the Federation, spoke of the immediate plans of his organization and the difficulties it was now facing. The Federation, which was in the first year of its existence, was made up of 55 societies representing 33 countries, and more were to be admitted. It enjoyed consultative status to Unesco and WHO. Dr. Rees said that it was planned later to carry out a world-wide investigation of mental health, but even with more limited activities their financial difficulties were considerable. The Federation needed £30,000 a year in order to establish an office in Geneva and arrange meetings of its members. At present the offices of the Federation were in London, and delegates travelled to the conferences at their own expense. He added that an anonymous donor had recently given £2,500 for three years as the salary of a medical director, and the Macy foundation had made a grant of $45,000. The Congress to be held in Geneva in August would discuss how the Federation could contribute most usefully to the plans of WHO. Dr. Rees hoped that surveys of rural, industrial, and student mental health could be carried out, making use of the existing administrative machinery of WHO. He emphasized that the Federation would not be made up solely of medical men and women, but would include educationists, journalists, and representatives of other professions concerned with mental health and public education.

Royal College of Obstetricians and Gynaecologists

The Honorary Fellowship of the Royal College of Obstetricians and Gynaecologists was conferred on Sir Henry Dale, O.M., F.R.S., and Professor E. J. Heyman, of the Radiumhemmet, Stockholm, at a meeting of the council of the college held on July 5. Professor Hilda Lloyd and Professor Chassar Moir, sponsoring Sir Henry Dale, referred to the effect of his work on ergot and pituitrin on practical obstetrics. Dr. Malcom Donaldson and Miss Martindale introduced Professor Heyman. The president of the college, Sir William Gilliatt, welcomed the new Fellows.

South African Medical and Dental Council Overruled

Recently the Medical and Dental Council of South Africa refused registration to Dr. Grantly Dick Read. This ruling was set aside by the Supreme Court on June 23. According to Mr. Justice de Villiers, " . . . as the Act and the rules now read, in my judgment, Dr. Read has fulfilled all the conditions requisite for registration, and the council had no jurisdiction to refuse him registration on grounds extraneous to the clear provisions of the Act."

Rye Flour

The Ministry of Food states that patients who are allergic to wheat or wheat-flour extracts need no longer produce a medical certificate to obtain supplies of rye flour. They should try to get rye flour from a retailer in the normal way. If they have any difficulty they should seek advice from the local food office.

Commonwealth Fund Fellowships

Appointments to Commonwealth Fund Fellowships in Medicine from September, 1949, are announced as follows: J. C. S. Paterson, M.B., Ch.B., M.R.C.P. (to University of Rochester); G. J. Romanes, Ph.D., M.B., Ch.B. (to University of Columbia); and G. Smith, M.B., Ch.B. (to Johns Hopkins University). Information concerning Fellowships, which are offered by the Commonwealth Fund of New York, may be obtained from the secretary, Commonwealth Fund Fellowships, 35, Portman Square, London, W.1. Appointments are tenable by British graduates in American universities for one year.

Sanderson-Wells Prize

Dr. S. S. B. Gilder, assistant editor of *Abstracts of World Medicine*, has been awarded the Sanderson-Wells (Senior) Prize of the University of London for 1949 for his essay entitled "Symptoms and Signs of Experimentally Induced Vitamin Deficiency in Man." The prize (value £20) is awarded for the best essay on a subject set by the university submitted within one year of the competitor's taking the London degree of M.B., B.S.

Cambridge Medical Graduates' Club

Mr. W. H. C. Romanis presided over a meeting of the Cambridge University Medical Graduates' Club at Pembroke College on July 8, followed by a dinner in the College Hall. Mr. S. C. Roberts, Master of the College, gave an informal speech of welcome. Mr. H. U. Willink, P.C., Master of Magdalen, said that so far as he could judge the quality of the students entering medicine was high, and Sir Lionel Whitby said a few words about the plans for medicine in Cambridge.

Wills

Dr. Lorimer Gifford Nash, of Ashwell, Herts, who left £55,685, left £100 to the Royal Medical Benevolent Fund; Dr. Walter Edward Manby, of Pembroke, left £24,071; Dr. Harold Edward Gibson, of Seaton, Devon, £19,598; and Dr. Septimus Bodger, of Redditch, Worcs, £19,197.

COMING EVENTS

International Congress of Otolaryngology

The Fourth International Congress of Otolaryngology will be held at King's College, Strand, London, W.C., from July 18 to 23, and will be opened by the Duchess of Kent on Monday, July 18, at 11 a.m.

Old People at Home

A conference is being held on July 20 and 21 at the Royal College of Nursing at the request of the Public Health Section to discuss with representatives of national voluntary bodies immediate and economic ways of helping the aged and infirm in their own homes.

Banting Memorial Lecture

Dr. R. D. Lawrence will deliver the Banting Memorial Lecture at King's College Hospital Medical School, Denmark Hill, S.E., on Friday, July 22, at 10.30 a.m. His subject is "Insulin Therapy; Successes and Problems."

British Standards Institution

The annual general meeting of the British Standards Institution will be held on July 27 at 3 p.m. in the council room of the institution (first floor), 24, Victoria Street, London, S.W.1.

Psychotherapy and the Community

A summer school on "The Contribution of Psychotherapy to the Life of the Community in Medicine, in Education, and in Religion" will be held at the Davidson Clinic, 26, Chalmers Street, Edinburgh, on July 28–Aug. 3. The guest lecturers are Dr. S. H. Foulkes and Dr. George H. Day. Information may be obtained from the secretary at the address above.

International Congress of Catholic Doctors

The fourth International Congress of Catholic Doctors will be held in Rome from Sept. 24 to Oct. 1. An Audience with His Holiness will take place on Sept. 29. "Man in the Light of Medical Science" forms the subject for discussion. Doctors wishing to join the English delegation, which will be led by Dr. W. B. Pemberton, should communicate with Dr. W. J. O'Donovan, O.B.E., 130, Harley Street, London, W.1, before July 31.

SOCIETIES AND LECTURES

Saturday

BRITISH ASSOCIATION OF ALLERGISTS.—At Cardiff, July 16, general meeting. *Morning:* At Medical Unit, Cardiff Royal Infirmary, 10 a.m., "*The Treatment of Bronchial Asthma*," by Dr. Leon Unger; 11.15 a.m., "*Prognosis in Asthma*," by Dr. D. McCracken; 12 noon, "*Sino-bronchial Syndrome*," by Dr. P. T. Bray; 12.20 p.m., demonstration of pollen slides. *Afternoon:* At National Museum of Wales, 2.15 p.m., business meeting; 2.30 p.m., "*Pollen and Mould Studies at Cardiff*," by Messrs. H. A. Hyde and D. A. Williams.

Monday

LONDON UNIVERSITY.—At London School of Hygiene and Tropical Medicine, Keppel Street, W.C., July 18, 5.30 p.m., "*Normal and Pathological Physiology of the Kidney*," by Dr. D. D. van Slyke (Rockefeller Institute for Medical Research).

Tuesday

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 19, (1) 11 a.m., "*Collection of Specimens for Laboratory Diagnosis*," by Dr. R. Thomson; (2) 5 p.m., "*Non-gonococcal Urethritis*," by Dr. A. H. Harkness.

Wednesday

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 20, (1) 11 a.m., "*Skin Diseases of Possible Venereal Origin: Differential. Diagnosis of Genital Dermatoses*," by Dr. W. N. Mascall; (2) 5 p.m., "*Fistula, Carcinoma, and Foreign Bodies of the Urethra, and Injuries of the Urethra*," by Mr. C. H. Mills.

Thursday

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, London, S.E.—July 21, 3 p.m., demonstration by Mr. S. Power.

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 21, (1) 11 a.m., "*Yaws, Pinta, and Bejel*," by Dr. W. N. Mascall; (2) 5 p.m., "*Tumours of the Testicle*," by Mr. W. K. Irwin.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At 26, Portland Place, London, W., July 21, 7.30 p.m., "*The Mass Control of Malaria with the New Insecticides*," by Dr. A. Gabaldon (Venezuela). A discussion will follow.

Friday

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., July 22, 5 p.m., "*Injuries and Diseases of the Testicle and Epididymis other than Tumour or Tuberculosis*," by Mr. Harland Rees.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.—July 22, 10.30 a.m., "*Insulin Therapy; Successes and Problems*," Banting Memorial Lecture by Dr. R. D. Lawrence.

Saturday

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—At Leicester Royal Infirmary, July 23, 28th annual general meeting. Presidential Address by Dr. C. Hamilton Wilkie: "*The Leicester V.D. Clinic and the New Health Scheme*."

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Bishop.—On July 1, 1949, at River Park Nursing Home, Leamington Spa, to Dr. Mary (née FitzClarke), wife of Dr. J. W. Bishop, a son.

Blair.—On July 2, 1949, at Queen Victoria Nursing Institution, Wolverhampton, to Mary, wife of Dr. Eric J. Blair, a son.

Fraser.—On July 8, 1949, in London, to Edith Victoria (née Foyle, M.B.), wife of Frederick E. Fraser, M.B., a son.

Harper.—On June 22, 1949, to Barbara, wife of Ernest Harper, F.R.C.S., of East Malling, Kent, a daughter.

Millar.—On July 2, 1949, at the London Hospital, to Patricia, wife of Dr. W. Bruce Millar, a son.

Thurston.—On June 28, 1949, at St. Mary's Hospital, Paddington, London, W., to Gabrielle (née Denvir), wife of John V. Thurston, M.B., B.S., a son—Graham Patrick.

DEATHS

Birks.—On June 25, 1949, at 4, Goldington Road, Bedford, Guy Thornton Birks, M.B., B.Ch., aged 71.

Briscoe.—On July 1, 1949, James Rynd Briscoe, M.B., B.Ch., of Chardstock.

Darroch.—On June 19, 1949, at an infirmary, Glasgow, Margaret Baird Sprout Darroch, M.B., Ch.B., late of Blackpool.

Finlay.—On July 10, 1949, at Wells Dene, Gloucester, Douglas Edward Finlay, M.B., B.S., J.P.

Forman.—On June 23, 1949, at a nursing home, Scarborough, Bernard Gilpin Forman, M.B.E., M.B., J.P., late of The Beeches, Cloughton, aged 75.

Green.—On June 27, 1949, at 24, Romsey Road, Eastleigh, Hants, Leslie Ernest Green, M.R.C.S., L.R.C.P., aged 45.

Henderson.—On July 1, 1949, at 52, Prestwick Road, Ayr, George Henderson, M.B., Ch.B., formerly of Peckham, aged 73.

Hood.—On July 1, 1949, at a nursing home, Thomas Hood, C.M.G., M.R.C.S., L.R.C.P., of Miramar, Pelham Gardens, Folkestone, aged 78.

James.—On June 24, 1949, at 32, Marine Terrace, Aberystwyth, Gwilym James, M.R.C.S., L.R.C.P.

Johnson.—On June 28, 1949, Arthur Carveth Johnson, M.B., B.Ch., of 21, Bassaleg Road, Newport.

Jones.—On July 6, 1949, Reginald Lewis Jones, L.S.A., Surgeon-Commander R.N., Ret., of Riversdale, Brixton Deverill, Warminster, Wilts.

Lawrence.—On July 5, 1949, Laurie Asher Lawrence, F.R.C.S., of Belsize Square, London, N.W., aged 91.

Leebody.—On July 2, 1949, in Hammersmith Hospital, John Galwey Leebody, M.B., Ch.B., F.R.C.S.Ed., aged 49.

Lieberman.—On June 25, 1949, Hyman Barnett Lieberman, M.B., Ch.M., F.R.C.S.Ed., 44, The Rope Walk, Nottingham, aged 46.

Macdonald.—On June 30, 1949, at 73, Greenhill, London, N.W., George Alexander Macdonald, M.B., Ch.B., 137, Harley Street, London, W.

Mahony.—Recently, at 189, Drake Street, Rochdale, Martin James Mahony, L.R.C.P.&S.Ed., aged 82.

Milne.—On July 4, 1949, Alastair David Milne, M.R.C.S., L.R.C.P.

Milroy.—On July 1, 1949, at 26a, Warren Drive, Wallasey, William Cunningham Milroy, M.D., J.P.

Morgan.—On June 9, 1949, at Virginia Water, Surrey, Laurence Sebastian Morgan, M.B., Ch.B., aged 67.

Ross.—On June 30, 1949, at the Stratford-on-Avon Hospital, Henry Ross, M.B., C.M., aged 87.

Ross.—On July 3, 1949, at Twickenham, Gilbert Matheson Ross, M.B., Ch.B.

Simpson.—On June 22, 1949, at Meadow Bank, Thursby, Carlisle, Harold Christopher Simpson, L.M.S.S.A., D.P.H.

Smith.—On July 7, 1949, at home, John Charles Smith, M.B., L.D.S.

Spillane.—On June 12, 1949, in a Singapore hospital, David James Patrick Spillane, M.R.C.S., L.R.C.P., Lieutenant-Colonel, I.M.S., aged 38.

Swayne.—On June 30, 1949, at 16, Higher Polsham Road, Paignton, Devon, Richard Woodward Swayne, O.B.E., M.B., B.S., aged 69.

Tait.—On June 25, 1949, at a nursing home, Edinburgh, Joseph Gillison Tait, M.R.C.S., L.R.C.P.

Willan.—On June 24, 1949, at 14, York Avenue, Hove, George Thomas Willan, D.S.O., T.D., M.R.C.S., L.R.C.P., late Colonel R.A.M.C., aged 74.

Wittkowski.—On June 26, 1949, at Hampstead General Hospital, David Wittkowski, M.D., 24, Aberdare Gardens, London, N.W., aged 81.

Any Questions ?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Pulmonary Tuberculosis and Pregnancy

Q.—*What is the safest, least violent modern method for terminating pregnancy of two months' duration? The case in question is that of a girl aged 17 who has recently come out of a sanatorium, where she has been for three years with bilateral pulmonary tuberculosis. Although the disease seems to be quiescent at the moment, the patient's general condition is not good.*

A.—Although there may be special circumstances which justify it in this case, a decision to terminate pregnancy should be made only with the knowledge that the consensus of modern opinion is that pregnancy and childbirth do not have any significant effect on pulmonary tuberculosis—no matter whether it be active or quiescent. This is the general conclusion reached by C. J. Stewart and F. A. H. Simmonds (*British Medical Journal*, 1947, **2**, 726); R. C. Cohen (ibid., 1943, **2**, 775); C. J. Barone, J. A. Fino, and L. H. Hetherington (*Amer. J. Obstet. Gynec.*, 1947, **54**, 475); L. L. Friedman and J. R. Garber (*Amer. Rev. Tuberc.*, 1947, **54**, 275), and was again expressed by speakers at a meeting held in Newcastle-upon-Tyne on March 25, 1949, and reported in this *Journal* (June 11, p. 1047). The whole subject was also discussed at the recent meeting at Harrogate of the Section of Preventive Medicine (July 9, p. 92). It is extremely doubtful whether induction of abortion improves the patient's prospects—at least in those cases where a sanatorium regimen and collapse therapy are available during and after pregnancy.

If it is decided to terminate pregnancy the operation should be carried out at once, if only because it becomes technically more difficult and dangerous as the pregnancy advances beyond eight weeks. Up to this stage dilatation of the cervix and evacuation of the uterus under general anaesthesia is probably the most satisfactory procedure. Anaesthesia provides little in the way of a problem provided a specialist anaesthetist with modern equipment is available. A method of inducing abortion which has achieved some popularity in this country in recent years is the intrauterine injection of an abortifacient paste. It is attractive in that it is simple and does not require an anaesthetic, but it is a method which is by no means free from risk, nor is it certain in its results. It was dealt with in considerable detail in a reply to a question published in this *Journal* (1947, **2**, 317).

"Pituitary Obesity"

Q.—*What is the modern treatment of pituitary obesity? Is there any preparation of anterior pituitary available for use in this condition?*

A.—The diagnosis of pituitary obesity implied in this question is usually made in the absence of any detectable gross lesion, and is somewhat hypothetical. Further, the question implies that the adiposity is due to a deficiency of anterior pituitary and can be rectified by replacement therapy with one of its hormones. If the pituitary itself is a primary cause of adiposity, the reverse of this supposition is probably the case, and the poor food intake with consequent wasting of animals subjected to hypophysectomy but whose hypothalamus has not been interfered with is well known. It has recently been shown that pituitary adrenocorticotropic hormone leads to an increased appetite and increased weight, quite apart from water retention. Therapeutically, in the absence of a gross lesion the treatment of pituitary obesity, or hypothalamic–pituitary obesity, or idiopathic obesity, consists of (1) low-calorie diet; (2) diuretics to counteract water retention; (3) such substances as amphetamine sulphate, which reduce appetite by central nervous action.

Lipstick Dermatitis

Q.—*Is anything known about allergy to lipsticks? What is the treatment in the case of a woman aged 33 who has a condition of the lips characterized by constant painless exfoliation, leaving small raw patches which heal, and by a swelling of the lips about two hours after the application of lipstick?*

A.—Lipstick dermatitis may be due to hypersensitiveness to perfume, fatty base, or colouring matter—usually eosin—and this can be determined by patch-test investigation. The great majority of cases are due to hypersensitivity to eosin, and there may be a superadded factor of induced light-sensitiveness, eosin being fluorescent. There are few lipsticks which do not contain eosin, but such should be sought if that substance is shown to be the cause of the dermatitis; inquiry from recognized cosmetic firms is advised. If the dermatitis is due to perfume or base, a change of lipstick would probably be effective. The previous application of a barrier cream, of the kind employed as a protective against industrial irritants to the lips, has been known to permit the use of a lipstick without injury.

Combined Diphtheria–Pertussis Vaccination

Q.—*A baby, now aged 15 months, had a first inoculation of diphtheria–pertussis vaccine when aged 9 to 10 months. What is the risk of sensitization attacks now? Is it safe to carry on as usual? What dosage is recommended for diphtheria and whooping-cough vaccine, singly or combined?*

A.—There is no risk of sensitization in an infant of 15 months given an injection of combined diphtheria and pertussis prophylactic six months previously. A second injection of 1 ml. of the combined vaccine given now will act as an efficient secondary stimulus. The combination of pertussis vaccine and diphtheria toxoid does not interfere with the immunizing potency of either reagent.

Intravenous Iron Therapy

Q.—*Is there a preparation of iron safe for intravenous use? If so, please give dosage and precautions necessary.*

A.—Saccharated iron oxide in 5% dextrose solution may be successfully given intravenously. Davidson and Girdwood described a dramatic response to saccharated oxide of iron given intravenously in a case of refractory iron-deficiency anaemia (*British Medical Journal*, 1948, **1**, 733). Nissim recommended the following course:

10 mg. of iron in	1 ml.
25 „ „ „ „	2.5 ml.
50 „ „ „ „	5 ml.
100 „ „ „ „	10 ml.
250 „ „ „ „	25 ml.
500 „ „ „ „	50 ml.

Thrombophlebitis, fever, tachycardia, cyanosis, and headache may arise after the larger doses. A detailed description of the intravenous use of an iron–sucrose preparation has just been published by Slack and Wilkinson (*Lancet*, 1949, **1**, 11), and this should be consulted, as should Nissim's paper (Ibid., 1947, **2**, 49).

Sulphur-containing Sweat

Q.—*A man of 44, in good health except for a long history of constipation, has noticed that his touch turns silver articles black. What is the pathology and what is the treatment of this complaint?*

A.—It is probable that the black discoloration of silver articles is due to the formation of silver sulphide; the sulphur is presumably derived from the patient's sweat. It is known that chronic constipation is occasionally associated with sulphaemoglobinaemia in the condition called "enterogenous cyanosis." Possibly in the present case the prolonged constipation has been combined with excessive formation of hydrogen sulphide in the bowel, sufficient being absorbed to increase the excretion of sulphur compounds in the sweat. It would be interesting to know if spectroscopy shows any evidence of sulphaemoglobinaemia. Whatever the precise cause, the indication is to establish a normal bowel function.

Osteomalacia or Senile Osteoporosis ?

Q.—*What is the modern treatment of osteomalacia, and what is the prognosis? A female aged 65 suffers from this disease, most marked in the bodies of the cervical and lumbar vertebrae. This has led to a loss of weight, knock-knees, and disk lesions at the levels of C4-5 and L5-S1. At present she is having a high-protein diet with 180 gr. (12 g.) calcium gluconate and 2,700 units vitamin D daily and suitable physiotherapy. Serum calcium and urine calcium figures are within normal range. The history is approximately of nine months' duration, and there is no evidence of hormone imbalance.*

A.—If the diagnosis of osteomalacia is correct the treatment being given appears to be appropriate and should prove effective. But osteomalacia is uncommon in this country, and unless there are special features to support the diagnosis it seems more probable that the case is one of senile osteoporosis of the spine. True osteomalacia is usually characterized by curvatures of the tibiae and femora, and coxa vara; the shape of the pelvis is altered, the acetabula being displaced medially. These deformities represent the effect of body weight on the softened bones. In senile osteoporosis the main changes are in the vertebral bodies. There is considerable bone atrophy, and the intervertebral disks bulge into the softened spongy tissue of the vertebral bodies, which assume a biconcave appearance. There is a general kyphosis, often pronounced, and in addition there may be marked wedging of individual vertebrae. The underlying cause of senile osteoporosis is unknown, and curative treatment is not available. Nevertheless the wearing of a light but strong spinal support is often a useful palliative.

Letterer–Siwe's Disease

Q.—*I am interested in a child of 19 months who was taken ill in South Africa some months ago with what at first was diagnosed as glandular fever; she has been ailing ever since, with mild pyrexia, and her condition has recently been recognized as Letterer-Siwe's disease. Would you kindly tell me the cause, treatment, and prognosis?*

A.—Letterer–Siwe's disease is a systemic aleukaemic non-lipoid reticulo-endotheliosis occurring sporadically, usually in infants or young children. It is characterized by fever, marked splenomegaly, some hepatomegaly, generalized adenopathy, eczematous, granulomatous, petechial, or haemorrhagic cutaneous lesions, localized tumours with rarefactions in bone, and secondary anaemia with usually a normal white cell count. The cause is unknown, but possibly may be infective. Treatment is uncertain and unsatisfactory, but chemotherapeutic agents, antibiotics, and *x*-ray irradiation may be tried. The majority of reported cases have been fatal.

Intermittent Claudication

Q.—*What are the prognosis and treatment of intermittent claudication in a man of 50 otherwise in good health? X-ray examination shows some calcification of the leg vessels. Does this finding add to the gravity of the prognosis?*

A.—The word "prognosis" in this question has a certain ambiguity: it may refer to the survival of the patient or to the survival of the patient's lower limbs. In respect of the first, the outlook at this age is not good and expectation of life is undoubtedly reduced. Arterial degeneration is unlikely to be limited to the vessels of the legs, and many patients with this disorder die from coronary thrombosis; this is a danger additional to the threat to life which would be afforded by the onset of gangrene. The prognosis in respect of the legs is also likely to be poor. At such an age the arterial obstruction is usually diffuse and adequate collateral circulation is difficult to attain; the degenerative process advances more rapidly than in a man twenty years older, and consequently the blood supply to the legs will probably become increasingly defective. Calcification in the arteries of the leg indicates that these vessels are degenerate; it does not make the prognosis more grave. The presence of intermittent claudication is already evidence of arterial inadequacy.

Treatment depends somewhat on the site of arterial obstruction: if of a main vessel, efforts to increase collateral circulation by plasma transfusions, intermittent venous occlusion, and sympathectomy are often followed by improvement. When the distal vessels are affected the prognosis is worse and the results of treatment more disappointing. In both types scrupulous care of the feet is essential if gangrene is to be avoided. The precise details of treatment will be found in any of the current textbooks.

Ergotamine Tartrate

Q.—*A patient who for many years has waked in the night with a severe throbbing headache has received complete relief from 1 mg. of ergotamine tartrate taken prophylactically before retiring. Is this patient likely to develop ergotism, and, if so, approximately how long is it safe to go on giving the ergotamine?*

A.—Different people differ greatly in their tolerance to ergotamine tartrate. Usually 1 mg. is well tolerated, but if the drug is being taken every night the patient must be on the look-out for such symptoms as burning or tingling sensations in the legs, toes, or hands. Ergometrine should be tried instead of ergotamine. Ergometrine is equally effective in relieving attacks of migraine in many people, and does not cause ergotism. If this does not work, then dihydroergotamine (DHE-45) might be given in a dose of 2 mg. This drug is considerably less toxic than ergotamine.

NOTES AND COMMENTS

Dyspareunia.—Dr. B. SANDLER (Urmston, Lancs) writes: May I disagree with the reply given under this heading ("Any Questions?" June 4, p. 1017)? In a patient with a psychopathic background, as described, glass dilators should not be used at all—not even on patients with a normal background are they often required. She should be advised to apply oestrone ointment to the introitus, and then perform self-dilatation by the gentle insertion, first of her fore-finger, next of two fingers, and finally of two or three fingers and thumb, over a period of a fortnight. The use of her own fingers is less frightening and more completely controllable; whilst the oestrone ointment produces local vasodilatation, which assists in relaxation.

Report on a Cure for Cancer.—Dr. F. WIBAUT, Secretary-Treasurer of the Netherlands Medical Association, writes: An Amsterdam physician, Dr. J. Samuels, advertises at home and abroad that he has found a universal method to cure malignant and benign tumours, diabetes, and multiple sclerosis. The method consists of radiotherapy by means of radiation with short waves of the hypophysis. Dr. Samuels does not judge the result according to the usual clinical and pathological methods, but by observing the supposed changes in the circulating blood. These changes are alleged to be visible through a fold of the skin by means of a spectroscope. The Minister of Social Affairs, who is also responsible for the supervision of public health, has asked the President of the Council for Public Hygiene to examine this matter. The result of this examination has been that not one single case of cure of the diseases mentioned above has been confirmed. Besides that, the method of diagnosis and the therapy must be looked upon as completely worthless.

The result of the examination has been published as "The Report to the Minister," dated January, 1949 (States Printing Office, The Hague. Price 1.27 florins). An abstract of the report has been published by the medical weekly of the Netherlands Medical Association, *Medisch Contact*. Copies of this issue of *Medisch Contact* may be obtained on application to the office of the Netherlands Medical Association, Keizersgracht 327, Amsterdam (C).

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS should communicate with the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors overseas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager, B.M.A. House, Tavistock Square, London, W.C.1 (hours 9 a.m. to 5 p.m.). TELEPHONE: EUSTON 2111. TELEGRAMS: *Britmedads, Westcent, London.*

MEMBERS' SUBSCRIPTIONS should be sent to the SECRETARY of the Association. TELEPHONE: EUSTON 2111. TELEGRAMS: *Medisecra, Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.